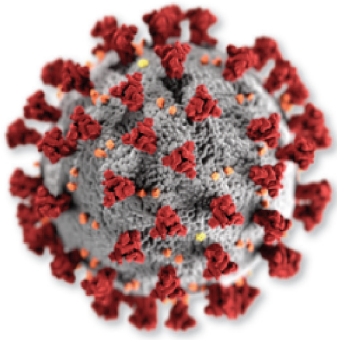
# GLOBAL BIOTERRORISM



## A Global Fraud Of Unprecedented Dimensions Unleashed Upon The Earth's Population — We Are The Gain-Of-Function Targets —

# 2019–2030

## Who, How & Why

An mRNA-Free Injection of Truth by Jeff Prager and Anarchy Books, LLC • USA
Executive Editor and COO • Mr. Khalid Latif • Pakistan

A Free Runaway Slaves Publication • JPrager©July 16, 2021

A Lisbon court has ruled that only 0.9% of 'verified cases' died of COVID-19, numbering a total of 152, not the 17,000 deaths the government and health care systems originally claimed. Following a citizen's petition the Lisbon court was forced to provide verified COVID-19 mortality data. According to the government ruling, the number of verified COVID-19 deaths from January 2020 to April 2021 is only 152, not about 17,000 as claimed previously by government ministries. All the "others" died for various reasons, although their PCR test was positive. Since March 2020, 152 people have died of covid in Portugal, formally indicated by the Ministry of Health and confirmed by a court, NOT 17,000. The same can be said to be true for every country on the planet. They all lie.

~ andre-dias.net - June 19th, 2021

"We live in a fraud of unprecedented dimensions"

Source:
https://andre-dias.net/152-mortes-de-covid-em-portugal-desde-janeiro-2020/?fbclid=IwAR2pLrlmMqRJiZHVh6FAN8WVIJY4H3d8-AWybqDpiA7a27gRYyZj2e0_cvY

## FAIR USE NOTICE

This report contains copyrighted material the use of which has not always been specifically authorized by the copyright owner. The material is being made available without profit in efforts to advance understanding of criminal justice, political machinations, human rights, economic rights, democracy, scientific honesty, social justice issues, etc. The belief is this constitutes a 'fair use' of any such copyrighted material as provided for in section 107 of the US Copyright Law. In accordance with Title 17 U.S.C. Section 107, the material in this report is distributed without profit to those who have expressed a prior interest in receiving the included information for research and educational purposes, by publicizing contact information. For more information on this law go to: http://www.law.cornell.edu/uscode/17/107.shtml. If you wish to use copyrighted material from this report for purposes of your own that go beyond 'fair use', you must obtain permission from the copyright owner.

## LIABILITY

The publisher(s) and writer(s) disclaims all liability for any loss, damage, injury or expense however caused, arising from the use of or reliance upon, in any manner, the information provided through this report and does not warrant the truth, accuracy or completeness of the information provided. It's possible that a few of the hypotheses generated from this information will be shown to be false when the investigative records are made public, and for that, if it should occur, the publisher(s) and writer(s) apologize in advance.

## INTENT

The publisher(s) and writer(s) warrant that the information presented in this report is an accurate reflection of information presented in published, peer reviewed journals gleaned from public news sites on the internet. Information on these sites is sometimes presented by individuals or organizations which may be viewed as pursuing objectives which are hateful and malicious. If information on such sites appears to have merit, and that information is consistent with other facts in the investigation, the factual information from that site is included as best possible, without any reflection on the merit of that site's objectives. The intent of this report is to 1) provide a hypothetical explanation for the alleged COVID pandemic that incorporates currently public information not included in official government reports, and 2) focus public attention on circumstances that strongly suggest there has been wrong doing by private individuals, elected and appointed public officials and national and international organizations involved in the dissemination of propaganda leading to the misuse of government resources, 3) explain why officials may have been motivated to mislead the American public, and 4) provide a foundation of research and an hypothesis for future investigation. Information presented in this report documents that the federal institutions responsible for investigating these events are currently involved in efforts to suppress the facts possibly under the guise of pure greed, euthanasia, a sickening of the global population and severe, relentless propaganda and illegal censorship. Hence, this information is being made public in the hope that unknown officials with appropriate level of authority can re-institute the appropriate investigation, or that private investigative resources can further substantiate (or very unlikel disprove) the claims made herein.

# FORWARD

**PROOF**: Noun - evidence, verification, corroboration, authentication, confirmation, certification, documentation, validation, attestation, substantiation.

**EVIDENCE**: Noun - 1. proof, confirmation, verification, substantiation, corroboration, affirmation, attestation; 2. testimony, statement, attestation, declaration, avowal, submission, claim, contention, allegation; Law deposition, representation, affidavit; 3. signs, indications, pointers, marks, traces, suggestions, hints; manifestation.

**EVIDENCE**: Verb - indicate, show, reveal, display, exhibit, manifest; testify to, confirm, prove, substantiate, endorse, bear out; formal evince.

Using PROOF and EVIDENCE this free eBook attempts to convince the general public that the entire planet is undergoing a decades long, well-planned style of bio-warfare against the total human population. Bio-warfare, Bio-terrorism, Bio-Militarism, Bio-blackmail, Bio-Media and Bio-finance (AI and Robotics of course) have perfectly aligned to produce the most malevolent hoax ever perpetrated on an unsuspecting public not just in modern times but in all recorded history. It's a catastrophe of unimagineable proportions.

The End Game is the Great Reset and with it comes a Social Credit System of sorts. This will include constant surveillance, our movements from place to place recorded, spending habits documented, medical records databased, biometric ID's, a cashless society and if Klaus Schwab, the banks, the Tech Companies, the Pharmaceutical companies and in particular Bill Gates, George Soros, the Clinton Foundation and about 1500 billionaire globalists, bankers and multinational resource controllers have their way, and it's likely they will, you'll own nothing, rent everything and you'll be happy. At least they say so and they surely seem to think so. I won't live that long, but let me know if we see one another again. I've collected transcripts from videos by physicians, both practicing and retired, and national and international attorneys whom I've come to respect. These are heroes willing to speak out when doing so causes Facebook, Twitter and Google to ban you, delete your web site and eliminate your ability to reach the public. Moreover, millions of dollars are spent behind the scenes to destroy reputations and erase the truth-tellers from the historic record. Science itself has been compromised and our local, state and federal elected and appointed officials are guilty of malfeasance, attempt to defraud in excess of 100 billion dollars, violations of the US Constitution, the Nuremberg Laws, Informed Consent and serious violations of Human Rights. We, the public, are part of the largest human

experiment ever undertaken and we're being injected with a group of chemicals, a concoction truth be told, that causes the human body to manufacture a toxin — the S-Spike Protein. Yes, the cells that now manufacture the S-Spike Protein are fabricating and mass producing a human toxin in the human body of every person that's been injected with these new, untested, genetically altering biologics. Infertility, heart problems and blood clotting are just the initial manifestations, an expression of things to come. Cancers, Parkinson's Disease, Muscular Dystrophy, Encephalitis, Guillain Barre Syndrome, early onset Dementia's, Alzheimer's and a host of almost 100 autoimmune disorders and very likely millions of deaths, if not billions, are already inevitable in the years ahead. Each and every one of us will become a pharmaceutical "Customer For Life" in the very near future. The pace is set, the strategy is running on time like clock-work and the agenda is clear. One Tweet of 1000s that were repeated ad nauseum by the media was buried. Just one. Trump Tweeted endlessly and the media ate it up with commentary and reposts of every single Trump Tweet and as I said there were thousands. Yet one was dead on arrival, neatly tucked away and forgotten, entombed forever, and it was a simple Tweet.

## "You Can't Stop What's Coming"

~ Donald Trump on Twitter

While I believe this is one of the very few times Mr. Trump told the truth, the fact that the Tweet was immediately and promptly buried six feet under reveals the single truth he was willing to reveal and we can't by any stretch of the imagination, stop what's coming, in my opinion. But we can survive the onslaught. Avoiding injection is just the start. As Dr. Peter McCullough states, and as you'll read in the linked video transcripts, we need a large block of people that remain unvaccinated, that they can't touch, that will remain on Ivermectin and additional preventative protocols now being used by almost 25% of the American population and with this block of people to compare to the injected portion of the population, the truth will be revealed and those behind this massive, global Bio-terrorism will be exposed.

We need sunshine, fresh air and we need each other more than ever before in human history. We need to find a way to love our neighbors in spite of what may be righteous and valid disagreements over politics, religion, nationality and opinions in general. Our differences compared to what's coming down the pike, are immaterial, unimportant and will separate and divide us enabling us to be fully conquered. Divide and conquer is, without question, the Order Of The Day and it's one of the most critical parts of the overall strategy we, as a people, we, as the human race, must beat back forcefully and never succumb to. If we don't learn to simply love one another in spite of our differences, as Dr. Bhakti states, we're doomed.

~ Jeff Prager

# THE DROSTEN PAPER

Anyone who spends any sort of time on social media can't have missed the increasingly frequent disagreements that have bloomed over the threat posed by the Covid-19 virus.

Debate, it seems, has begun to fall into two distinct camps: those who consume and then regurgitate the 'facts' as told to the world at large by the UK and other governments; and those whose hunger for knowledge on the subject has led them to other sources of the truth.

One of the scientists regularly quoted in these frequently heated social media exchanges is Dr. Mike Yeadon whose public debunking of much of the data being peddled in support of what many consider to be Draconian anti-Covid measures was widely reported in the UK media in the late summer. Many critics of Dr. Yeadon denounced the evidence he presented on the basis that he was a former Chief Scientific Officer with pharmaceutical giant Pfizer – the same company that manufactured the vaccine currently being rolled out to front-line workers and the vulnerable.

His professional associations aside – none of which should really have any bearing on his reputation as a scientist, by the way – it is hard to ignore the weight of the evidence that his work offers.

Dr. Yeadon is one of 22 scientists who make up the International Consortium of Scientists in Life Science (ICSLS) which has released compelling data to prove the polymerase chain reaction (PCR) test – widely used around the world to diagnose Covid-19 infection – is 'fatally flawed'. At the end of November, 2020, the ICSLS called on an organization called Euro-surveillance to withdraw its study in support of the protocols that are used in the PCR test. The study – known as the Corman-Drosten paper – was published in January of 2019, just one day after it was submitted. Quite apart from raising serious questions about the integrity of what is considered to be the shortest scientific peer review in history, it also raises serious questions about the motivation for fast-tracking its publication.

The ICSLS says its own research proves the PCR test – the test, remember, upon which every single piece of the government's increasingly dictatorial anti-Covid strategy is based – is all but completely useless and says it makes a nonsense of Euro-surveillance's January study. The most significant of the 10 fatal flaws in the PCR test, according to a report by respected science journalist Peter Andrews, include:

Non-specificity due to erroneous design, meaning it is not accurate in determining evidence of a specific covid strain; Test results are enormously variable. An inability to differentiate between virus fragments and whole virus. It has no positive or negative controls.

It has no standard operating procedure – meaning that even if you disregard the accuracy of the test itself, results are not consistent with each other due to variable application protocols. Obviously, there is a great deal of hard science that sits behind the ICSLS findings, but in a nutshell what it means is that the test returns an astonishingly high number of false positive results – estimated by some to be as great as 97%. The extent of the dis-ingenuity of the original January paper becomes clearer when you learn that, according to Peter Andrews' report, at least three of its authors are allegedly on the payroll of the first companies to win the PCR testing contracts. So, what does this mean to you and me? In essence the biggest impact on our everyday lives is that we are living under stringent restrictive measures that have been informed by poor science with no credible basis in fact.

It also lends weight to Yeadon's own views that much of the country had achieved herd immunity as early as the summer and that the virus is on the wane, not on the rise. It also lends credence to data that shows mortality rates during November of this year were actually lower than in the same period five years previously.

More than that, though, it also raises another question which is about the extent of the virus itself. No one doubts that the virus exists, or that it poses a threat to the vulnerable and the elderly. But does the real extent of the virus – which is to say not the extent suggested by what we can now safely conclude are statistically unsafe tests – justify the societal and economic impact of the measures that affect our daily lives?

My own view is that they do not. As Peter Andrews concludes at the end of his report, it is far more likely that we are seeing a pseudo-pandemic that bears no relation to the supposed 'truth' the government and its narrow church of scientific advisers would have us believe.

I have written previously on the power of Vitamins C and D in helping to combat covid infection naturally, and you can read more on that at the FLCCC and BiRD web sites.

As we leave the summer months behind and approach the normal viral season, it's a good time of year to question the facts around the pandemic and the government's response to it. Read the full January paper from Euro-surveillance and also find out more about ICSLS and its own review of the Corman-Drosten report.

There is a wealth of evidence and data out there relating to Covid-19 and the basis on which government strategy is based – we all just need to be interested enough to look for it and then question what we are being told by a government which seems disinclined to take advice from a wide body of expertise. Most of the evidence is right here in the text that follows, in peer review, respected medical testimony, letters and more.

B/RD British *Ivermectin* Recommendation Development

FLCCC ALLIANCE

The Evidence-Based Medicine Consultancy Ltd

Professor Chris Butler
Professor Richard Hobbs

Lead Investigators—The PRINCIPLE Trial University of Oxford —UK (Via email)

Dear Professors,

We write to you today with serious and urgent concerns about the randomized controlled trial of Ivermectin which you are about to begin in the UK.

At the outset, it is puzzling to understand why a trial of ivermectin would even be necessary, given the preponderance of peer-reviewed scientific evidence that has been published across the globe. This unassailable evidence includes dozens of randomized controlled trials, and a systematic review and meta analysis (using the rigorous Cochrane methods) that all show large magnitude improvements in case counts, hospitalizations and deaths using ivermectin. Therefore, it seems profoundly unethical to mount a trial designed to withhold efficacious treatment from any trial subject since it is quite possible that participants in the control arm could worsen or die without it. Accordingly, in consideration of the above, your recent statement that, "*Several small clinical studies have found that ivermectin may help to treat COVID-19. However, we need more evidence from large clinical trials, which is why we have concluded the treatment in the PRINCIPLE Trial*," is at best misleading, and at worst immoral.

Our catalogue of concerns also includes the design of the trial itself. If subjects are enrolled in the PRINCIPLE trial for up to 15 days after onset of symptoms, this could result in the enrollment of people with long standing symptoms, who need more intensive combination therapy including corticosteroids, and those who have already recovered. Such late enrollment would in effect be evaluating anti-inflammatory and immunomodulatory effects of ivermectin and not assessing it's antiviral properties, and steroids would also be indicated. It is now well known that COVID-19 is best treated early and with combination therapy. Treating with Ivermectin far too late in the disease does little to rationalize a good study. The low doses of ivermectin to be given in the trial—an oral dose of 0.3 mg/kg body weight for 3 days—is insufficient and will result in unreliable results data. The existing data from randomized controlled trial indicates a dose response in terms of time to viral clearance and time to symptomatic improvement, with a dose of 0.4 to 0.6 mg/kg

for 5 days appearing optimal.

The Evidence-Based Medicine Consultancy, Ltd.

Another area of considerable uneasiness over your proposed trial of Ivermectin is that the protocol is dated February, 2021. This means that the information in the trial consent form is both outdated and inaccurate since the latest evidence from June 2021—as previously articulated—shows that ivermectin prevents deaths from COVID-19. It is imperative that the most up-to-date evidence be provided to prospective study subjects in the consent form. The conclusions of the most recent peer-reviewed studies (below) should be integrated into the form to ensure that participants are aware of Ivermectin's proof of efficacy against COVID-19.

https://journals.lww.com/americantherapeutics/abstract/9000/ivermectin_for_prevention_and_treatment_of.98040.aspx

https://journals.lww.com/americantherapeutics/fulltext/2021/06000/review_of_the_emerging_evidence_demonstrating_the.4.aspx

What is also highly ambiguous is the process that will be used to differentiate study subjects between the participants who are unvaccinated and those with post-vaccination COVID-19. If your study includes both vaccinated and unvaccinated subjects, how will you distinguish them? Furthermore, is there a plan in place for randomization to be stratified according to vaccination status?

In conclusion, it is our strong belief that The PRINCIPLE Trial is a non-essential, poorly designed study that will lead to a harvest of unreliable data concerning the utility of Ivermectin in COVID-19. Any further delays in getting safe, effective, early treatments to patients will result in additional needless illness and death.

Dr. Pierre Kory, FLCCC Alliance
Dr. Tess Lawrie, The BiRD Group
305 Northgate House, Upper Borough Walls, Bath BA1 1RG, United Kingdom
+44 7826 939 464 – tess@e- 2 bmc.co.uk – www.e-bmc.co.uk
Registered in England and Wales no. 08690151

Sincerely,

Dr. Pierre Kory, FLCCC Alliance

Dr. Tess Lawrie, The BiRD Group

## Latest (at printing) CDC VAERS Data Show Reported Injuries Surpass 400,000 Following COVID Vaccines

VAERS data released today, July 2nd, 2021, by the CDC showed a total of 441,931 reports of adverse events from all age groups following COVID vaccines, including 6,985 deaths and 34,065 serious injuries between Dec. 14, 2020 and June 25, 2021. More adverse events than ever recorded for any previous vaccine-like injection. However, this is a biological messenger RNA injection with potential for genetic alteration and a myriad of adverse events—proven for all to see in the VAERS data at the Adverse Events Registry.

## 6,985 DEATHS and CLIMBING RAPIDLY

My quick analysis is, I believe we're under the application of a form of bio-terrorism that's worldwide that appears to have been many years in the planning and that the first wave of the terrorism is a respiratory virus that spread across the world and affected relatively few people—about 1% of many populations but generated great fear. The virus was responsible for some deaths in the very frail and elderly but otherwise it was like having the common cold. But that fear was used very quickly and I think surprisingly to generate tremendous influences in human life, lock-downs, all the things you know about. And every single thing that was done in the public health response to the [alleged] pandemic made it worse. So over-testing, even lock-downs probably made it worse because the virus evolved over time to become more contagious. So every single response made it worse.

# CHAPTER ONE

## THE CORONA SCANDAL

1. Establishing The Facts by Attorney Reiner Fuellmich
2. Worldwide Bio-terrorism, a discussion with Dr. Peter McCullough
3. Standing At The Gates Of Hell by Dr. Michael Yeadon

"I believe we're under the application of a form of bio-terrorism that's worldwide that appears to have been many years in the planning."

~ By Dr. Peter McCullough, with Attorney Reiner Fuellmich, Dr. Wolfgang Wodarg, Dr. Bhakti, Dr. Tenpenny and many others are in full agreement. It's not the virus, it's the injections.

# The Corona Scandal • Part 1

## ESTABLISHING THE FACTS

by Attorney Reiner Fuellmich

My name is Reiner Fuellmich and I have been admitted to the Bar in Germany and in California for 26 years. I have been practicing law primarily as a trial lawyer against fraudulent corporations such as Deutsche Bank, formerly one of the world's largest and most respected banks, today one of the most toxic criminal organizations in the world; Volkswagen (VW), one of the world's largest and most respected car manufacturers, today notorious for its giant diesel fraud; and Kuehne and Nagel, the world's largest shipping company. We're suing them in a multi-million-dollar bribery case.

Attorney Reiner Fuellmich

I'm also one of four members of the German Corona Investigative Committee. Since July 10, 2020, this Committee has been listening to a large number of international scientists' and experts' testimony to find answers to questions about the corona crisis, which more and more people worldwide are asking. All the above-mentioned cases of corruption and fraud committed by the German corporations pale in comparison in view of the extent of the damage that the corona crisis has caused and continues to cause. This corona crisis, according to all we know today, must be renamed a "Corona Scandal" and those responsible for it must be criminally prosecuted and sued for civil damages.

On a political level, everything must be done to make sure that no one will ever again be in a position of such power as to be able to defraud humanity or to attempt to manipulate us with their corrupt agendas. And for this reason I will now explain to you how and where an international network of lawyers will argue this biggest tort case ever, the corona fraud scandal, which has meanwhile unfolded into probably the greatest crime against humanity ever committed. Crimes against humanity were first defined in connection with the Nuremberg trials after World War II, that is, when they dealt with the main war criminals of the Third Reich. Crimes against humanity are today regulated in section 7 of the International Criminal Code. The three major questions to be answered in the context of a judicial approach to the corona scandal are:

**1**. Is there a corona pandemic or is there only a PCR-test pandemic? Specifically, does a positive PCR-test result mean that the person tested is infected with Covid-19, or does it mean absolutely nothing in connection with the Covid-19 infection?
**2**. Do the so-called anti-corona measures, such as the lock-down, mandatory face masks, social distancing, and quarantine regulations, serve to protect the world's population from corona, or do these measures serve only to make people panic so that they believe – without asking any questions – that their lives are in danger, so that in the end the pharmaceutical and tech industries can generate huge profits from the sale of PCR tests, antigen and antibody tests and vaccines, as well as the harvesting of our genetic fingerprints?
**3**. Is it true that the German government was massively lobbied, more so than any other country, by the chief protagonists of this so-called corona pandemic, Mr. Drosten, virologist at charity hospital in Berlin; Mr. Wieler, veterinarian and head of the German equivalent of the CDC, the RKI; and Mr. Tedros, Head of the World Health Organization or WHO; because Germany is known as a particularly disciplined country and was therefore to become a role model for the rest of the world for its strict and, of course, successful adherence to the corona measures?

Answers to these three questions are urgently needed because the allegedly new and highly dangerous corona virus has not caused any excess mortality anywhere in the world, and certainly not here in Germany. But the anti-corona measures, whose only basis are the PCR-test results, which are in turn all based on the German Drosten test, have, in the

Let me first give you a summary of the facts as they present themselves today. The most important thing in a lawsuit is to establish the facts – that is, to find out what actually happened. That is because the application of the law always depends on the facts at issue. If I want to prosecute someone for fraud, I cannot do that by presenting the facts of a car accident. So what happened here regarding the alleged corona pandemic?

The facts laid out below are, to a large extent, the result of the work of the Corona Investigative Committee. This Committee was founded on July 10, 2020 by four lawyers in order to determine, through hearing expert testimony of international scientists and other experts:

1. How dangerous is the virus really?
2. What is the significance of a positive PCR test?
3. What collateral damage has been caused by the corona measures, both with respect to the world population's health, and with respect to the world's economy?

Let me start with a little bit of background information. What happened in May 2019 and then in early 2020? And what happened 12 years earlier with the swine flu, which many of you may have forgotten about? In May 2019, the stronger of the two parties which govern Germany in a grand coalition, the CDU, held a Congress on Global Health, apparently at the instigation of important players from the pharmaceutical industry and the tech industry. At this Congress, the usual suspects, you might say, gave their speeches. Angela Merkel was there, and the German Secretary of Health, Jens Spahn. But, some other people, whom one would not necessarily expect to be present at such a gathering, were also there: Professor Drosten, virologist from the Charite hospital in Berlin; Professor Wieler, veterinarian and Head of the RKI, the German equivalent of the CDC; as well as Mr. Tedros, philosopher and Head of the World Health Organization (WHO). They all gave speeches there. Also present and giving speeches were the chief lobbyists of the world's two largest health funds, namely the Bill and Melinda Gates Foundation and the Wellcome Trust. Less than a year later, these very people called the shots in the proclamation of the worldwide corona pandemic, made sure that mass PCR tests were used to prove mass infections with Covid-19 all over the world, and are now pushing for vaccines to be invented and sold worldwide.

These infections, or rather the positive test results that the PCR tests delivered, in turn became the justification for worldwide lock-downs, social distancing and mandatory face masks. It is important to note at this point that the definition of a pandemic was changed 12 years earlier. Until then, a pandemic was considered to be a disease that spread worldwide and which led to many serious illnesses and deaths. Suddenly, and for reasons never explained, it was supposed to be a worldwide disease only. Many serious illnesses and many deaths were not required any more to announce a pandemic. Due to this change,

the WHO, which is closely intertwined with the global pharmaceutical industry, was able to declare the swine flu pandemic in 2009, with the result that vaccines were produced and sold worldwide on the basis of contracts that have been kept secret until today.

These vaccines proved to be completely unnecessary because the swine flu eventually turned out to be a mild flu, and never became the horrific plague that the pharmaceutical industry and its affiliated universities kept announcing it would turn into, with millions of deaths certain to happen if people didn't get vaccinated. These vaccines also led to serious health problems. About 700 children in Europe fell incurably ill with narcolepsy and are now forever severely disabled.

The vaccines bought with millions of taxpayers' money had to be destroyed with even more taxpayers' money. Already then, during the swine flu, the German virologist Drosten was one of those who stirred up panic in the population, repeating over and over again that the swine flu would claim many hundreds of thousands, even millions of deaths all over the world. In the end, it was mainly thanks to Dr. Wolfgang Wodarg and his efforts as a member of the German Bundestag, and also a member of the Council of Europe, that this hoax was brought to an end before it would lead to even more serious consequences.

Fast forward to March of 2020, when the German Bundestag announced an Epidemic Situation of National Importance, which is the German equivalent of a pandemic in March of 2020 and, based on this, the lock-down with the suspension of all essential constitutional rights for an unforeseeable time, there was only one single opinion on which the Federal Government in Germany based its decision. In an outrageous violation of the universally accepted principle "audiatur et altera pars", which means that one must also hear the other side, the only person they listened to was Mr. Drosten.

That is the very person whose horrific, panic-inducing prognoses had proved to be catastrophically false 12 years earlier. We know this because a whistle-blower named David Sieber, a member of the Green Party, told us about it. He did so first on August 29, 2020 in Berlin, in the context of an event at which Robert F. Kennedy, Jr. also took part, and at which both men gave speeches. And he did so afterwards in one of the sessions of our Corona Committee.

The reason he did this is that he had become increasingly skeptical about the official narrative propagated by politicians and the mainstream media. He had therefore undertaken an effort to find out about other scientists' opinions and had found them on the Internet. There, he realized that there were a number of highly renowned scientists who held a completely different opinion, which contradicted the horrific prognoses of Mr. Drosten. They assumed – and still do assume – that there was no disease that went beyond the gravity of the seasonal flu, that the population had already acquired cross- or T-cell immunity against this allegedly new virus, and that there was therefore no reason for any special measures, and certainly not for vaccinations.

These scientists include Professor John Ioannidis of Stanford University in California, a specialist in statistics and epidemiology, as well as public health, and at the same time the most quoted scientist in the world; Professor Michael Levitt, Nobel prize-winner for chemistry and also a biophysicist at Stanford University; the German professors Kary Mölling, Sucharit Bhakti, Klud Wittkowski, as well as Stefan Homburg; and now many, many more scientists and doctors worldwide, including Dr. Mike Yeadon. Dr. Mike Yeadon is the former Vice-President and Scientific Director of Pfizer, one of the largest pharmaceutical companies in the world. I will talk some more about him a little later.

At the end of March, beginning of April of 2020, Mr. Sieber turned to the leadership of his Green Party with the knowledge he had accumulated, and suggested that they present these other scientific opinions to the public and explain that, contrary to Mr. Drosten's doomsday prophecies, there was no reason for the public to panic. Incidentally, Lord Sumption, who served as a judge at the British supreme court from 2012 to 2018, had done the very same thing at the very same time and had come to the very same conclusion: that there was no factual basis for panic and no legal basis for the corona measures. Likewise, the former President of the German federal constitutional court expressed – albeit more cautiously – serious doubts that the corona measures were constitutional. But instead of taking note of these other opinions and discussing them with David Sieber, the Green Party leadership declared that Mr. Drosten's panic messages were good enough for the Green Party. Remember, they're not a member of the ruling coalition; they're the opposition. Still, that was enough for them, just as it had been good enough for the Federal Government as a basis for its lock-down decision, they said. Then subsequently, the Green Party leadership called David Sieber a conspiracy theorist, without ever having considered the content of his information, and then stripped him of his mandates. Now let's take a look at the current actual situation regarding the virus's danger, the complete uselessness of PCR tests for the detection of infections, and the lock-downs based on non-existent infections. In the meantime, we know that the health care systems were never in danger of becoming overwhelmed by Covid-19. On the contrary, many hospitals remain empty to this day and some are now facing bankruptcy. The hospital ship Comfort, which anchored in New York at the time, and could have accommodated a thousand patients,

never accommodated more than some 20 patients. Nowhere was there any excess mortality. Studies carried out by Professor Ioannidis and others have shown that the mortality of corona is equivalent to that of the seasonal flu. Even the pictures from Bergamo and New York that were used to demonstrate to the world that panic was in order proved to be deliberately misleading.

Then, the so-called "Panic Paper" was leaked, which was written by the German Department of the Interior. Its classified content shows beyond a shadow of a doubt that, in fact, the population was deliberately driven to panic by politicians and mainstream media. The accompanying irresponsible statements of the Head of the RKI – remember the [German]

**Children were made to feel responsible**

**"for the painful tortured death of their parents and grandparents**

**if they do not follow the corona rules".**

CDC – Mr. Wieler, who repeatedly and excitedly announced that the corona measures must be followed unconditionally by the population without them asking any question, shows that he followed the script verbatim. In his public statements, he kept announcing that the situation was very grave and threatening, although the figures compiled by his own Institute proved the exact opposite.

Among other things, the "Panic Paper" calls for children to be made to feel responsible – and I quote – "*for the painful tortured death of their parents and grandparents if they do not follow the corona rules*", that is, if they do not wash their hands constantly and don't stay away from their grandparents. A word of clarification: in Bergamo, the vast majority of deaths, 94% to be exact, turned out to be the result not of Covid-19, but rather the consequence of the government deciding to transfer sick patients, sick with probably the cold or seasonal flu, from hospitals to nursing homes in order to make room at the hospitals for all the Covid patients, who ultimately never arrived. There, at the nursing homes, they then infected old people with a severely weakened immune system, usually as a result of preexisting medical conditions. In addition, a flu vaccination, which had previously been administered, had further weakened the immune systems of the people in the nursing homes. In New York, only some, but by far not all hospitals were overwhelmed. Many people, most of whom were again elderly and had serious preexisting medical conditions, and most of whom, had it not been for the panic-mongering, would have just stayed at home to recover, raced to the hospitals. There, many of them fell victim to health care-associated infections (or nosocomial infections) on the one hand, and incidents of malpractice on the other hand, for example, by being put on a respirator rather than re-

ceiving oxygen through an oxygen mask. Again, to clarify: Covid-19, this is the current state of affairs, is a dangerous disease, just like the seasonal flu is a dangerous disease. And of course, Covid-19, just like the seasonal flu, may sometimes take a severe clinical course and will sometimes kill patients. However, as autopsies have shown, which were carried out in Germany in particular, by the forensic scientist Professor Klaus Püschel in Hamburg, the fatalities he examined had almost all been caused by serious preexisting conditions, and almost all of the people who had died had died at a very old age, just like in Italy, meaning they had lived beyond their average life expectancy.

In this context, the following should also be mentioned: the German RKI – that is, again the equivalent of the CDC – had initially, strangely enough, recommended that no autopsies be performed. And there are numerous credible reports that doctors and hospitals worldwide had been paid money for declaring a deceased person a victim of Covid-19 rather than writing down the true cause of death on the death certificate, for example a heart attack or a gunshot wound. Without the autopsies, we would never know that the overwhelming majority of the alleged Covid-19 victims had died of completely different diseases, but not of Covid-19. The assertion that the lock-down was necessary because there were so many different infections with SARS-COV-2, and because the healthcare systems would be overwhelmed is wrong for three reasons, as we have learned from the hearings we conducted with the Corona Committee, and from other data that has become available in the meantime: **A**: The lock-down was imposed when the virus was already retreating. By the time the lock-down was imposed, the alleged infection rates were already dropping again, and **B**: There's already protection from the virus because of cross- or T-cell immunity. Apart from the above mentioned lock-down being imposed when the infection rates were already dropping, there is also cross- or T-cell immunity in the general population against the corona viruses contained in every flu or influenza wave. This is true, even if this time around, a slightly different strain of the corona-virus was at work. And that is because the body's own immune system remembers every virus it has ever battled in the past, and from this experience, it also recognizes a supposedly new, but still similar, strain of the virus from the corona family. Incidentally, that's how the PCR test for the detection of an infection was invented by now infamous Professor Drosten.

At the beginning of January of 2020, based on this very basic knowledge, Mr. Drosten developed his PCR test, which supposedly detects an infection with SARS-COV-2, without ever having seen the real Wuhan virus from China, only having learned from social media reports that there was something going on in Wuhan, he started tinkering on his computer with what would become his corona PCR test. For this, he used an old SARS virus, hoping it would be sufficiently similar to the allegedly new strain of the corona-virus found in Wuhan. Then, he sent the result of his computer tinkering to China to determine whether the victims of the alleged new corona-virus tested positive. They did. And that was enough for the World Health Organization to sound the pandemic alarm and to rec-

ommend the worldwide use of the Drosten PCR test for the detection of infections with the virus now called SARS-COV-2. Drosten's opinion and advice was – this must be emphasized once again – the only source for the German government when it announced the lock-down as well as the rules for social distancing and the mandatory wearing of masks. And – this must also be emphasized once again – Germany apparently became the center of especially massive lobbying by the pharmaceutical and tech industry because the world, with reference to the allegedly disciplined Germans, should do as the Germans do in order to survive the pandemic. **C**. And this is the most important part of our fact-finding: the PCR test is being used on the basis of false statements, NOT based on scientific facts with respect to infections. In the meantime, we have learned that these PCR tests, contrary to the assertions of Messrs. Drosten, Wieler and the WHO, do NOT give any indication of an infection with any virus, let alone an infection with SARS-COV-2. Not only are PCR tests expressly not approved for diagnostic purposes, as is correctly noted on leaflets coming with these tests, and as the inventor of the PCR test, Kary Mullis, has repeatedly emphasized. Instead, they're simply incapable of diagnosing any disease. That is: contrary to the assertions of Drosten, Wieler and the WHO, which they have been making since the proclamation of the pandemic, a positive PCR-test result does not mean that an infection is present. If someone tests positive, it does NOT mean that they're infected with anything, let alone with the contagious SARS-COV-2 virus. Even the United States CDC, even this institution agrees with this, and I quote directly from page 38 of one of its publications on the corona-virus and the PCR tests, dated July 13, 2020. First bullet point says:

***"Detection of viral RNA may not indicate the presence of infectious virus or that 2019 nCOV [novel corona-virus] is the causative agent for clinical symptoms."***

Second bullet point says: ***"The performance of this test has not been established for monitoring treatment of 2019 nCOV infection."***

Third bullet point says: "***This test cannot rule out diseases caused by other bacterial or viral pathogens."***

It is still not clear whether there has ever been a scientifically correct isolation of the Wuhan virus, so that nobody knows exactly what we're looking for when we test, especially since this virus, just like the flu viruses, mutates quickly. The PCR swabs take one or two sequences of a molecule that are invisible to the human eye and therefore need to be amplified in many cycles to make it visible.

Everything over 35 cycles is – as reported by the New York Times and others – considered completely unreliable and scientifically unjustifiable. However, the Drosten test, as well as the WHO-recommended tests that followed his example, are set to 45 cycles. Can that be because of the desire to produce as many positive results as possible and thereby provide

the basis for the false assumption that a large number of infections have been detected?

The test cannot distinguish inactive and reproductive matter. That means that a positive result may happen because the test detects, for example, a piece of debris, a fragment of a molecule, which may signal nothing else than that the immune system of the person tested won a battle with a common cold in the past. Even Drosten himself declared in an interview with a German business magazine in 2014, at that time concerning the alleged detection of an infection with the MERS virus, allegedly with the help of the PCR test, that these PCR tests are so highly sensitive that even very healthy and non-infectious people may test positive. At that time, he also became very much aware of the powerful role of a panic and fear- mongering media, as you'll see at the end of the following quote. He said then, in this interview: "If, for example, such a pathogen scurries over the nasal mucosa of a nurse for a day or so without her getting sick or noticing anything, then she's suddenly a MERS case. This could also explain the explosion of case numbers in Saudi Arabia. In addition, the media there have made this into an incredible sensation."

Has he forgotten this? Or is he deliberately concealing this in the corona context because corona is a very lucrative business opportunity for the pharmaceutical industry as a whole? And for Mr. Alford Lund, his co-author in many studies and also a PCR-test producer. In my view, it is completely implausible that he forgot in 2020 what he knew about the PCR tests and told the business magazine in 2014.

In short, this test cannot detect any infection, contrary to all false claims stating that it can. An infection, a so-called "hot" infection, requires that the virus, or rather a fragment of a molecule which may be a virus, is not just found somewhere, for example, in the throat of a person without causing any damage – that would be a "cold" infection. Rather, a "hot" infection requires that the virus penetrates into the cells, replicates there and causes symptoms such as headaches or a sore throat. Only then is a person really infected in the sense of a "hot" infection, because only then is a person contagious, that is, able to infect others. Until then, it is completely harmless for both the host and all other people that the host comes into contact with. Once again, this means that positive test results, contrary to all other claims by Drosten, Wieler, or the WHO, mean nothing with respect to infections, as even the CDC knows, as quoted above.

Meanwhile, a number of highly respected scientists worldwide assume that there has never been a corona pandemic, but only a PCR-test pandemic. This is the conclusion reached by many German scientists, such as professors Bhakti, Reiss, Mölling, Hockertz, Walach and many others, including the above-mentioned Professor John Ioannidis, and the Nobel laureate, Professor Michael Levitt from Stanford University.

The most recent such opinion is that of the aforementioned Dr. Mike Yeadon, a former

Vice-President and Chief Science Officer at Pfizer, who held this position for 16 years. He and his co-authors, all well-known scientists, published a scientific paper in September of 2020 and he wrote a corresponding magazine article on September 20, 2020. Among other things, he and they state – and I quote:

"We're basing our government policy, our economic policy, and the policy of restricting fundamental rights, presumably on completely wrong data and assumptions about the corona-virus. If it weren't for the test results that are constantly reported in the media, the pandemic would be over because nothing really happened. Of course, there are some serious individual cases of illness, but there are also some in every flu epidemic. There was a real wave of disease in March and April, but since then, everything has gone back to normal. Only the positive results rise and sink wildly again and again, depending on how many tests are carried out. But the real cases of illnesses are over. There can be no talk of a second wave. The allegedly new strain of the corona-virus is ..."

– Dr. Yeadon continues –

"... only new in that it is a new type of the long-known corona virus. There are at least four corona-viruses that are endemic and cause some of the common colds we experience, especially in winter. They all have a striking sequence similarity to the corona-virus, and because the human immune system recognizes the similarity to the virus that has now allegedly been newly discovered, a T-cell immunity has long existed in this respect. 30 per cent of the population had this before the allegedly new virus even appeared. Therefore, it is sufficient for the so-called herd immunity that 15 to 25 per cent of the population are infected with the allegedly new corona-virus to stop the further spread of the virus. And this has long been the case."

Regarding the all-important PCR tests, Yeadon writes, in a piece called "Lies, Damned Lies and Health Statistics: The Deadly Danger of False Positives", dated September 20, 2020, and I quote: "The likelihood of an apparently positive case being a false positive is between 89 to 94 per cent, or near certainty."

Dr. Yeadon, in agreement with the professors of immunology Kamera from Germany, Kappel from the Netherlands, and Cahill from Ireland, as well as the microbiologist Dr. Arve from Austria, all of whom testified before the German Corona Committee, explicitly points out that a positive test does not mean that an intact virus has been found.

The authors explain that what the PCR test actually measures is – and I quote: "Simply the presence of partial RNA sequences present in the intact virus, which could be a piece of dead virus, which cannot make the subject sick, and cannot be transmitted, and cannot make anyone else sick." Because of the complete unsuitability of the test for the detection

of infectious diseases – tested positive in goats, sheep, papayas and even chicken wings – Oxford Professor Carl Heneghan, Director of the Centre for Evidence-Based Medicine, writes that the Covid virus would never disappear if this test practice were to be continued, but would always be falsely detected in much of what is tested. Lock-downs, as Yeadon and his colleagues found out, do not work. Sweden, with its laissez-fair approach, and Great Britain, with its strict lock-down, for example, have completely comparable disease and mortality statistics. The same was found by US scientists concerning the different US states. It makes no difference to the incidence of disease whether a state implements a lock-down or not.

With regard to the now infamous Imperial College of London's Professor Neil Ferguson and his completely false computer models warning of millions of deaths, he says that – and I quote: "No serious scientist gives any validity to Ferguson's model." He points out with thinly veiled contempt – again I quote: "It's important that you know, most scientists don't accept that it ..." – that is, Ferguson's model – "was even faintly right. But the government is still wedded to the model." Ferguson predicted 40 thousand corona deaths in Sweden by May and 100 thousand by June, but it remained at 5,800 which, according to the Swedish authorities, is equivalent to a mild flu. If the PCR tests had not been used as a diagnostic tool for corona infections, there would not be a pandemic and there would be no lock-downs, but everything would have been perceived as just a medium or light wave of influenza, these scientists conclude. Dr. Yeadon in his piece, "Lies, Damned Lies and Health Statistics: The Deadly Danger of False Positives, writes: "This test is fatally flawed and must immediately be withdrawn and never used again in this setting, unless shown to be fixed." And, towards the end of that article, "I have explained how a hopelessly performing diagnostic test has been, and continues to be used, not for diagnosis of disease, but it seems solely to create fear".

Now let's take a look at the current actual situation regarding the severe damage caused by the lock-downs and other measures. Another detailed paper, written by a German official in the Department of the Interior, who is responsible for risk assessment and the protection of the population against risks, was leaked recently. It is now called the "False Alarm" paper. This paper comes to the conclusion that there was and is no sufficient evidence for serious health risks for the population as claimed by Drosten, Wieler and the WHO, but – the author says – there's very much evidence of the corona measures causing gigantic health and economic damage to the population, which he then describes in detail in this paper. This, he concludes, will lead to very high claims for damages, which the government will be held responsible for. This has now become reality, but the paper's author was suspended.

More and more scientists, but also lawyers, recognize that, as a result of the deliberate panic-mongering, and the corona measures enabled by this panic, democracy is in great

danger of being replaced by fascist totalitarian models. As I already mentioned above, in Australia, people who do not wear the masks, which more and more studies show, are hazardous to health, or who allegedly do not wear them correctly, are arrested, handcuffed and thrown into jail. In the Philippines, they run the risk of getting shot, but even in Germany and in other previously civilized countries, children are taken away from their parents if they do not comply with quarantine regulations, distance regulations, and mask-wearing regulations. According to psychologists and psychotherapists who testified before the Corona Committee, children are traumatized en masse, with the worst psychological consequences yet to be expected in the medium- and long-term. In Germany alone, to bankruptcies are expected in the fall to strike small- and medium-sized businesses, which form the backbone of the economy. This will result in incalculable tax losses and incalculably high and long-term social security money transfers for – among other things – unemployment benefits.

Since, in the meantime, pretty much everybody is beginning to understand the full devastating impact of the completely unfounded corona measures, I will refrain from detailing this any further.

Let me now give you a summary of the legal consequences. The most difficult part of a lawyer's work is always to establish the true facts, not the application of the legal rules to these facts. Unfortunately, a German lawyer does not learn this at law school but his Anglo-American counterparts do get the necessary training for this at their law schools. And probably for this reason, but also because of the much more pronounced independence of the Anglo-American judiciary, the Anglo-American law of evidence is much more effective in practice than the German one. A court of law can only decide a legal dispute correctly if it has previously determined the facts correctly, which is not possible without looking at all the evidence. And that's why the law of evidence is so important. On the basis of the facts summarized above, in particular those established with the help of the work of the German Corona Committee, the legal evaluation is actually simple. It is simple for all civilized legal systems, regardless of whether these legal systems are based on civil law, which follows the Roman law more closely, or whether they are based on Anglo-American common law, which is only loosely connected to Roman law.

Let's first take a look at the unconstitutionality of the measures. A number of German law professors, including professors Kingreen, Morswig, Jungbluth and Vosgerau have stated, either in written expert opinions or in interviews, in line with the serious doubts expressed by the former president of the federal constitutional court with respect to the constitutionality of the corona measures, that these measures – the corona measures – are without a sufficient factual basis, and also without a sufficient legal basis, and are therefore unconstitutional and must be repealed immediately. Very recently, a judge, Thorsten Schleif is his name, declared publicly that the German judiciary, just like the general pub-

lic, has been so panic-stricken that it was no longer able to administer justice properly. He says that the courts of law – and I quote – "have all too quickly waved through coercive measures which, for millions of people all over Germany, represent massive suspensions of their constitutional rights. He points out that German citizens – again I quote – "are currently experiencing the most serious encroachment on their constitutional rights since the founding of the federal republic of Germany in 1949". In order to contain the corona pandemic, federal and state governments have intervened, he says, massively, and in part threatening the very existence of the country as it is guaranteed by the constitutional rights of the people.

What about fraud, intentional infliction of damage and crimes against humanity? Based on the rules of criminal law, asserting false facts concerning the PCR tests or intentional misrepresentation, as it was committed by Messrs. Drosten, Wieler and WHO, as well as the WHO, can only be assessed as fraud. Based on the rules of civil tort law, this translates into intentional infliction of damage. The German professor of civil law, Martin Schwab, supports this finding in public interviews. In a comprehensive legal opinion of around 180 pages, he has familiarized himself with the subject matter like no other legal scholar has done thus far and, in particular, has provided a detailed account of the complete failure of the mainstream media to report on the true facts of this so-called pandemic. Messrs. Drosten, Wieler and Tedros of the WHO all knew, based on their own expertise or the expertise of their institutions, that the PCR tests cannot provide any information about infections, but asserted over and over again to the general public that they can, with their counterparts all over the world repeating this. And they all knew and accepted that, on the basis of their recommendations, the governments of the world would decide on lock-downs, the rules for social distancing, and mandatory wearing of masks, the latter representing a very serious health hazard, as more and more independent studies and expert statements show. Under the rules of civil tort law, all those who have been harmed by these PCR-test-induced lock-downs are entitled to receive full compensation for their losses. In particular, there is a duty to compensate – that is, a duty to pay damages for the loss of profits suffered by companies and self-employed persons as a result of the lock-down and other measures.

In the meantime, however, the anti-corona measures have caused, and continue to cause, such devastating damage to the world population's health and economy that the crimes committed by Messrs. Drosten, Wieler and the WHO must be legally qualified as actual crimes against humanity, as defined in section 7 of the International Criminal Code.

How can we do something? What can we do? Well, the class action is the best route to compensatory damages and to political consequences. The so-called class action lawsuit is based on English law and exists today in the USA and in Canada. It enables a court of law to allow a complaint for damages to be tried as a class action lawsuit at the request of

a plaintiff if:

1. As a result of a damage-inducing event ...
2. A large number of people suffer the same type of damage.

Phrased differently, a judge can allow a class-action lawsuit to go forward if common questions of law and fact make up the vital component of the lawsuit. Here, the common questions of law and fact revolve around the worldwide PCR-test-based lock-downs and its consequences. Just like the VW diesel passenger cars were functioning products, but they were defective due to a so-called defeat device because they didn't comply with the emissions standards, so too the PCR tests – which are perfectly good products in other settings – are defective products when it comes to the diagnosis of infections. Now, if an American or Canadian company or an American or Canadian individual decides to sue these persons in the United States or Canada for damages, then the court called upon to resolve this dispute may, upon request, allow this complaint to be tried as a class action lawsuit.

If this happens, all affected parties worldwide will be informed about this through publications in the mainstream media and will thus have the opportunity to join this class action within a certain period of time, to be determined by the court. It should be emphasized that nobody must join the class action, but every injured party can join the class.

The advantage of the class action is that only one trial is needed, namely to try the complaint of a representative plaintiff who is affected in a manner typical of everyone else in the class. This is, firstly, cheaper, and secondly, faster than hundreds of thousands or more individual lawsuits. And thirdly, it imposes less of a burden on the courts. Fourthly, as a rule it allows a much more precise examination of the accusations than would be possible in the context of hundreds of thousands, or more likely in this corona setting, even millions of individual lawsuits.

In particular, the well-established and proven Anglo-American law of evidence, with its pretrial discovery, is applicable. This requires that all evidence relevant for the determination of the lawsuit is put on the table. In contrast to the typical situation in German lawsuits with structural imbalance, that is, lawsuits involving on the one hand a consumer, and on the other hand a powerful corporation, the withholding or even destruction of evidence is not without consequence; rather the party withholding or even destroying evidence loses the case under these evidence rules.

Here in Germany, a group of tort lawyers have banded together to help their clients with recovery of damages. They have provided all relevant information and forms for German plaintiffs to both estimate how much damage they have suffered and join the group or

class of plaintiffs who will later join the class action when it goes forward either in Canada or the US. Initially, this group of lawyers had considered to also collect and manage the claims for damages of other, non-German plaintiffs, but this proved to be unmanageable.

However, through an international lawyers' network, which is growing larger by the day, the German group of attorneys provides to all of their colleagues in all other countries, free of charge, all relevant information, including expert opinions and testimonies of experts showing that the PCR tests cannot detect infections. And they also provide them with all relevant information as to how they can prepare and bundle the claims for damages of their clients so that, they too, can assert their clients' claims for damages, either in their home country's courts of law, or within the framework of the class action, as explained above.

These scandalous corona facts, gathered mostly by the Corona Committee and summarized above, are the very same facts that will soon be proven to be true either in one court of law, or in many courts of law all over the world.

These are the facts that will pull the masks off the faces of all those responsible for these crimes. To the politicians who believe those corrupt people, these facts are hereby offered as a lifeline that can help you readjust your course of action, and start the long overdue public scientific discussion, and not go down with those charlatans and criminals.

# "BIOTERRORISM IS A REAL GLOBAL CATASTROPHE"

## The Corona Scandal • Part 2
## WORLDWIDE BIOTERRORISM

Dr. Of Law Reiner Fuellmich in a discussion with Dr. Peter McCullough
Transcript Of Video - Selected Excerpts - July 2nd, 2021

***Mr. Reiner Fuellmich:***
What is your take on this entire situation? I know a lot of doctors have changed their mind because they began to understand that there's a lot of evidence that points in the direction that there really is no actual pandemic but there's something else going on, what do you think of what's going on?

### *Dr. Peter McCullough:*

My quick analysis is, I believe we're under the application of a form of bio-terrorism that's worldwide that appears to have been many years in the planning and that the first wave of the terrorism is a respiratory virus that spread across the world and affected relatively few people—about 1% of many populations but generated great fear.

The virus was responsible for some deaths in the very frail and elderly but otherwise it was like having the common cold. But that fear was used very quickly and I think surprisingly to generate tremendous influences in human life, lock-downs, all the things you know about. And every single thing that was done in the public health response to the [alleged] pandemic made it worse. So over-testing, even lock-downs probably made it worse because the virus evolved over time to become more contagious. So every single response made it worse.

How I got involved, as a doctor I thought the virus was going to be pretty easy to treat once we understood there were three phases—viral replication, cytokine storm and thrombosis. And so as I promulgated early treatment I started to meet resistance at all levels in terms of actually treating patients and then publishing papers and I'm the editor of two major journals, I'm in the business of publishing, so fortunately I had enough publication strength to publish the only two papers in the entire medical literature that teaches doctors how to treat COVID-19 at home to prevent hospitalization and death. We did the best we could without any funding or government support and we demonstrated that it results in about an 85% reduction in hospitalization and death. So what we have discovered is that the suppression of early treatment was tightly linked to the development of a vaccine and the entire program—as this in a sense bio-terrorism. Phase 1 rolled out and it was really all about keeping the population in fear and in isolation and preparing them to accept the vaccine which appears to be Phase 2 of this Bio-terrorism Operation.

Both the respiratory virus and the vaccine [injection] deliver to the human body the Spike Protein, the Gain Of Function Target of this Bio-terrorism Research. Now I can't come out and say all that on National TV today or at any time but what we have learned over time is that we can no longer communicate with government agencies. We actually couldn't communicate with our propagandized colleagues and major medical centers all of which appear to be under a spell, almost as if they're hypnotized right now, and doctors, good doctors are doing unthinkable things like injecting biologically active messenger RNA that produces this pathogenic Spike Protein into pregnant women. I think when the doctors wake up from their trance they're going to be shocked to think what they've done to people.

So our strategy was to organize—there are many groups—one group in the United States called C-19 that I organized and many of you get these emails, it's about a 1000 people,

another one's called FLCCC, Front Line Critical Care Consortium, another worldwide one is called PANDA, there's also HEART and BIRD and COVID Medical Network, Treatment Domiciliary in Italy. It's gotten to the point where people have amassed in the UK and Germany and have rallied for early treatment.

Governments have tried to block even any single milligram of treatment to individuals so we decided by the summer that we had to take our message to the people. We had one physicians association that worked with us called the Association of American Physicians And Surgeons, we've created a Home Patient Guide and we organized the United States into 4 National Telemedicine Services, 15 Regional Services, we broke through to the people and the people who got sick with COVID-19 called in, got medications prescribed to local pharmacies or to Mail Order Distribution [Compounding] Pharmacies and so without the government realizing or even understanding what was going on we crushed the epidemic curve in the United States towards the end of December [2020] and January [2021] but we basically took care of the [alleged] pandemic with about 500 doctors through Telemedicine Services and to this day we treat about 25% of the U.S. COVID-19 population that are actually at high risk—over age 50 with medical problems or present with severe symptoms and we basically handled the [alleged] pandemic and at the same time we've tried to keep ourselves above the political fray and we understand the suppression of early treatment is tightly linked to vaccination [injection]. Then we've let all the news on vaccination [injection] come out and we are working to change the public view on the vaccine.

The public initially accepted the vaccine and we had to kind of slowly turn the ship and now in the United States rates of vaccinations have been dropping since April 8th, 2021, they continue to drop every day, the vaccine centers that I go by are completely empty and in the United States they're becoming desperate to try to convince individuals to get a vaccine [injection]. They're offering free million dollar lottery tickets, all the universities that are trying to force vaccination are receiving resistance.

I'm the lead expert in the Bell-weather Houston Methodist case [153 nurses and doctors are refusing mandatory biological injection and face termination] which is currently being argued before a Judge in Texas and it's going to be quickly escalated to the Supreme Court of Texas where Houston Methodist, a leading hospital, is attempting to force the employees to receive the injection. We already have word that it's going to be escalated to the Supreme Court so it'll be a high, a very high visibility case.

We have a lot of activity going on in the United States, we are engaging more and more attorneys and it's great to have you and your team involved you know, in the international level and I imagine we're aligned on almost all the things I said.

### *Mr. Reiner Fuellmich:*
Let me quickly translate, but, um, give us a chance, because I don't want to be rude, but I completely forgot to introduce you because I thought that everybody knows you, I think most people do, but please tell us a little about your background.

### *Dr. Peter McCullough:*
I'm Peter McCullough, I'm a Professor of Medicine at Texas A&M College of Medicine on the Baylor-Dallas campus. I practice internal medicine and cardiology. When the pandemic hit I refocused all of my efforts on COVID-19. I'm the Editor of Reviews In Cardiovascular Medicine, I'm the Editor of Cardiorenal Medicine—that's my area of research—Senior Associate Editor of American Journal of Cardiology, I'm the President of the Cardiorenal Society, and in my field of Heart and Kidney connections I'm the most published person in my field in the world in history and I have developed a great experience in treating COVID-19, I've published the two major treatment papers and I've led the early treatment initiative in the United States.

So I have, whether people like it or not, but I have declared my medical authority in doing this to a greater extent than anybody in public health agencies or any other media doctors.

### *Mr. Reiner Fuellmich:*
Thank you so much. We can sure as hell be glad that you're on our side. Extremely grateful. So it appears that in the United States at least things are really changing right now.

### *Dr. Peter McCullough:*
We've clearly had an impact. I'm in Texas where we never underwent lock-downs. I was a strong proponent of us staying open. We had 35 treating doctors who were willing to go against their medical centers and treat patients. We were able to convince our governor to put an Executive Order recognizing natural immunity and banning any mandatory vaccines by a public agency, banning vaccine passports and banning any discrimination on passports. We recently passed similar legislation for private employers however, we were unable to get in a ban on private employers mandating the vaccine. So that part is going to be litigated with the Houston Methodist Bell-weather case.

We're very active. We have the American Front Line Doctors, there's another group that has a temporary restraining order in against pediatric vaccination filed in Alabama and we have cases filed in the State of Maine against falsely coding the test results positive, inflating the number of cases and that's, we have a variety of activities; we have allies in Washington; Senator Ron Johnson and Senator Rand Paul; we have allies in the media, largely FOX News and RealNews and OAN. We don't yet have CNN or MSNBC. But the C-9

Group that I loosely formed, we now are on national TV almost every night in the United States to provide a counter-viewpoint to Anthony Fauci and Wilenski at the CDC and NIH. We bring on different experts and continue to appear to the American people that we have more scientific credibility than the agencies.

### *Unknown Participant (Likely an Attorney or Legal Aid for/with Reiner Fuellmich)*

And why do you think that is that this Window Of Opportunity has opened for you to be on national TV, I mean that's quite something, here [in Germany] at this point, this is impossible basically.

### *Dr. Peter McCullough:*

Well, we had some help in the media, we had some open-eyed people who were willing to give some high level interviews, we have good Social Media contacts all over the world that really amplified things although we're consistently shut down on Twitter and YouTube we continue to find new strategies to get the points out. We're very evidence based, but you know the United States, we're a whole country of rebels—people who want to break the law—that's who we are and so we have the Children's Health Defense Fund, [Attorney] Robert F. Kennedy, Del Bigtree, we have some very big figures, I mean we had Senator Rand Paul come out and say listen I'm not taking the vaccine I've had COVID-19 and so did Senator Johnson. Sebastian Gorka interviewed me, he used to be in the Trump Administration, he interviewed me, he's going to come out on Sunday night and say he took Hydroxy-chloroquine and defeated COVID-19 in December and he's not taking the vaccine.

We have to have people be making these public statements. For instance on RealTV with Dan Ball coming up in a few hours, he's going to come on and say he's not taking the vaccine. We helped shut down the Los Angeles School District from mandating the vaccine, his kids go to school there, they've backed off on the mandates, so we're working very hard.

This is the strategy. We know that this is Bio-terrorism, we know that this is Phase 2 of Bio-terrorism, we don't know who's behind it but we know that they want a needle in every arm to inject messenger RNA or Adenoviral DNA into every human being, they want every human being... our goal is—we can't stop from everybody—but our goal is to get a large group that they cannot get to, that they cannot vaccinate. That would be COVID recovered, suspected COVID recovered, those with immunity, children, pregnant women and child bearing women—we want big block and if we can get that big block and break them, if we can break the needle in every arm then I think it will be exposed and what is the plan for "a needle in every arm."

### *Mr. Reiner Fuellmich:*

You know I'm sure glad that this is happening in the US right now because it took some time for people to really get going there. We're in close touch and in close cooperation with the attorneys, you didn't mention any names but I know you know Anna Garner and Tom Rence who are working on this TRO [Temporary Restraining Order] in Alabama, of course we're in close cooperation with CHD [Children's Defense Fund], Bobby Kennedy, Mary Holland, and we're also in close cooperation with these people and others in other countries like on the African Continent for example. There are some really good things going on right now. The tragic thing is though that here in Germany I think we have now a rate of vaccination where people have gotten their second vaccination, so-called 'vaccination,' of only 19% but those who have, those who got their first shot are up to close to 50% and whenever I'm in a cab for example, talking to the cab driver, it's very easy to talk with them because they seem to understand much more than many of the scientists and doctors who appear on mainstream media and they spread the news. It's more important, I think, and that's what we're trying to do here in Germany and Internationally, it's more important to spread the word, explain to the people, to get out the truth, to explain to them what these shots really do.

I saw an interview with you which almost mirrored by what your colleagues in Canada—we spoke with Dr. Roger Hodkinson, we spoke with Professor Luc Montagnier and with Byron Bridle, no we haven't spoken to Byron Bridle yet but everyone agrees, "This has got to stop immediately!" This is excessively, it's monstrously dangerous. We heard about how pregnant women who got the shots, it appears in their breast milk and of course I don't know if you said this or Byron Bridle said this but there are some cases of suckling infants who suffered bleeding disorders and other problems. So this is a monstrous thing that needs to be stopped and I think everybody agrees on this.

### *Dr. Peter McCullough:*

We're trying to get to this public health message that can really get the public health attention so I think it was about a week ago Harvey Reich and I appeared on FOX News and Harvey Reich did describe the vignette of the woman who got the vaccine and was breast feeding and it killed the baby. Today we have 800 cases of young people developing myocarditis or inflammation of the heart. Because I'm a cardiologist I have a clinical authority position here and I'm going to opine that because there's no clinical benefit whatsoever for young people to get the vaccine that even one case [of myocarditis] is too many.

The CDC distributed their slides today [mid-June] and their conclusion is, well, we're going to re-evaluate again a little bit later on in June. So our agencies have done nothing to reduce the risks of the vaccine. It's called "Risk Mitigation" and I've chaired over 2 dozen day safety monitoring boards for the FDA and the National Institutes of Health and with this program there is no "Critical Event Committee," there is no "Data Safety Monitoring Board,"

and there's no "Human Ethics Committee". Those structures are mandatory for all large clinical investigations. And so the word that's really used for what's going on is malfeasance, there's wrongdoing by those on position of authority and without any safety measures in place you can see what's going on. We're administering, basically it's the largest application of a biological product with the greatest amount of morbidity and mortality in the history of our country.

We are at over 5,000 deaths as you know, I think 15,000 hospitalizations, in the European Union (EU) it's over 10,000 deaths. We are working with Center for Medicaid Services (CMS) data and we have a pretty good lead that the real number is ten-fold. We knew from data from Harvard in 2016 that the Vaccine Adverse Event Reporting System only reports about 10% of what's really going on so we had to get another data source and we have inside people. We have now a whistelblower inside the CMS and we have two whistleblowers with the CDC and those are being developed right now in order to get this out. So we're looking at ten-X, we think we have 50,000 dead Americans. 50,000. So we actually have more deaths due to the vaccine per day then certainly the viral illness by far. It's basically in a sense it's propagandized Bio-terrorism by injection.

### *Mr. Reiner Fuellmich:*
Yeah, and the big question is who's behind it. The pictures becoming clearer.

### *Dr. Peter McCullough:*
I don't know the numbers but it's clear that the lead states are Texas and Florida which is good, those are two very big states and Florida has the most elderly people so they have shown, and that's where COVID strikes the most so we have shown great resilience in these independent states with these governors.

I just got the email from Laura Ingrham on Fox News. To just give you an idea at least we have one major news station that's with us. Her email says, "*tonight we're going to talk about, in a few hours, the mistrust in Fauci and the medical elites who do his bidding, the fallout from his emails, to do a Hydroxy-chloroquine study that show the drug was unfairly maligned. Finally this new concern about heart issues in young men after their second vaccination. The public has very little faith in what they're being told in terms of life and death*."

So you can see that we have really come a long way to get the media, at least some of the media coming with us. What I've learned in this whole thing is we gave up on the scientific publications, we gave up on these other things, we have to go straight to the people.

### *Mr. Reiner Fuellmich:*
Yeah, that is exactly what we think too. There's one major medium here in this country

[Germany] which has been critical, not overly critical, but critical to a point. They have just come out, I think yesterday, Oh, the day before with a story that explains how fraudulently the government, our own government informed the people about how the Health Care System was being overwhelmed when it wasn't. They gave us completely false numbers, completely false figures as far as the intensive beds are concerned. We had many more than they claimed and in addition there are real financial incentives to keep these beds unoccupied because there's so much money that's being paid to the hospitals and to the doctors.

This is all, you know the one good thing about this is that this has all come out into the open. So we're going to be able to deal with this and we will. We have enough people who are willing to fight, I think there's many more who just couldn't bring themselves to come out into the open but a few of them we just met today including the doctor who saved that woman whom we interviewed a couple of weeks ago.

### *Dr. Wolfgang Wodarg:*

Yes I have one thing or two things. One is that with the hospitals we have, from the office who is controlling the government and how they spend the money, they have clear numbers. They say that the clinical care in Germany cost 1.5 billion more than normally, the last years, and they have 8% less patients in the same time. So they got a lot of money but it was never overloaded, the clinical system in Germany.

The other thing I wanted to speak about—Bio-terrorism. I'm very, I want to distinguish there because you speak of Bio-terrorism by Vaccination and I think you're right when you say this. Because I don't think that there is a dangerous virus on the way now because if we speak about Bio-terrorism by Gain-Of-Function viruses, I'm very sure that Gain-Of-Function viruses, if they would spread they could not spread because they would kill their hosts. And so it's a very stupid virus that kills the host.

I'm eager to tell the people that they needn't be afraid of dangerous viruses that come from some laboratory in Wuhan, so that people are not terrified because there's something special. This is just a Corona virus and we are acquainted with Corona viruses, to SARS viruses, Beta-Corona viruses for twenty years now. Our immune system is so don't be afraid of the virus. Be afraid of the vaccination. The Bio-terrorism, this is the vaccination and not the virus.

### *Dr. Peter McCullough:*

Yeah, I agree with you. Natural immunity will be able to handle the variants as far as I can see. I'm not predicting another wave. In fact my last TV appearance I told America, listen, there's not going to be another wave and so when I come down, when i talk to America I'm very positive, I give a very joyous message, I calm down the country and by doing that

Fauci and the other people can't stand it because they want to promote fear, they want to promote suffering and they want to promote this vaccine and so that's their message and so we're just the opposite and we agree with you.

End transcript at 22:48 with 23:25 remaining. Video link:
https://www.bitchute.com/video/KcXOCUwDekZ2/

# The Corona Scandal • Part 3
## STANDING AT THE GATES OF HELL
By Dr. Michael Yeadon

Yes, hi, my name is Dr Mike Yeadon. I'm a qualified life science researcher, really. I have a first degree in biochemistry and toxicology and have a research-based PhD in respiratory pharmacology. And then I've worked for 32 years, mostly in big pharmaceutical companies, and 10 years in the biotechnology sector. So my last job in Big Pharma, I was the Vice President and Chief Scientist of Allergy and Respiratory Research. I left Pfizer in 2011. And then after that I founded, grew and sold a biotech company called Ziarco to Novartis. That was 2017. And so before that, and afterwards, an independent advisor to over 30 start-up biotechnology companies. So you would expect from that, that I am pro new medicines of all kinds. Our goals always were to address unmet medical needs and to do so with acceptable safety given the medical context. And I'm in favour of all modes of new medical treatments, whether they are biologicals or vaccines, small molecules, cream sprays, ointment, whatever.

But I'm fervently against unsafe medicines or medicines used in an inappropriate context. And so some of the things I'm going to say are not favourable to the current crop of gene-based vaccines, and it's for that reason that they're being inappropriately used. And I don't think they have a sufficient safety profile to be used as a sort of wide spectrum, public health prophylactic. As a result of that background in pharmaceutical industry, in biotechnology, I am pro new medical entities that treat unmet need and do so safely. And that's true whether the entity is a vaccine or a biological, like an antibody, or if it's what I would call a small molecule, therapeutic, a pill or tablet, but I'm anti unsafe medicines, regardless of what format they are. And so my criticisms sometimes fall on to unsafe, small molecule substances and sometimes on unsafe vaccines. So I'm generally pro new medicines as long as they are safe and effective and used appropriately. And I'm anti the opposite of those things. A few things have allowed me, I think, to spot what's going on in the world at the moment. I do have, I would say, two big advantages. One, I've loved biology since I was little. And this year marks the 40th year I've been studying, continuing to learn and to apply biology broadly, whether it's pharmacology, biochemistry, molecular biology, toxicology. And so I've got a very broad grounding in all things to do with life science in

terms of health and disease. But one of my former supervisors said that I had a remarkable facility that stood out above the ordinary things you'd have to do to be a vice president or a CEO. And he said that I was able to spot patterns in sparse data earlier than my peers did. So when there was not enough data for most people to judge what was going on, I would often be able to see it. I could see a pattern forming when there wasn't quite enough information. And really, I guess I was running a lot of simulations in my head and trying to work out, what could these small bits of information mean? Rather than waiting for more data, it's my word, I think I know what's happening here. And that would sometimes be applied to say target selection in industry, or how we should prosecute a programme or what the competition was doing. But on this occasion, it allowed me quite quickly to work out that what we were being told about this virus, and what we needed to do in order to stay safe was simply not true.

For example, early on in the UK, there were enormous changes made in attribution of causes of death. So we've never had anything as absurd as the rule that is now used. So if you should die, within 28 days of having a positive result in a, you know, an inappropriate test using molecular biology, then you would be declared to have died of COVID-19. That's just wrong. It's not just a matter of disagreeing professionally, it's just complete nonsense. And we can certainly talk about the unreliability, untrustworthy nature of PCR Testing. But also, things like lock-down. I mean, just the whole phrase of it, the fact that it was completely unprecedented. And that we basically were to minimize contact one with another. And that that was going to save us. I knew quite early on that that was rubbish. And the reason is simple, that only people who are ill and have symptoms are really strong, infectious risks to other people. And those people are not people who are walking around in the community, because if you're full of virus, and symptomatic, you are also ill, and ill people tend to stay at home or in bed, or if they're very serious, they end up in hospital, or die. And so the idea that if you cut normal contacts at work, and, you know, just civic society, in your normal economy, that that would slow the epidemic spreading, I was fairly sure fairly early on that that was bunk. Unfortunately, it took several months before that was clear. By which time the idea that lock-down is what you need to do had been pretty much cemented in most of the world. So basically, everything your government has told you about this virus, everything you need to do to stay safe is a lie. Every part of it. And I'll be challenged on that. Literally, there are no…none of the key themes that you hear talked about from asymptomatic transmission to top up vaccines, not one of those things is supported by the science. Every piece is cleverly chosen, adjacent to something that probably is true, but is itself a lie, and has led people to where I believe we are right now. And I don't normally use phrases like this, but I think we are standing at the very gates of hell.

Yeah, when I first heard the phrase locked down, for example, I hope like most people, I thought this is a phrase you use in relation to controlling unruly prisoners. It's a control

measure. And I think pretty much all that has happened since is to do with control, this myth of asymptomatic transmission, which is simply not true, as I mentioned earlier, in order to transmit a virus, to be a good efficient source of infection, you have to have a lot of virus. And if you have a lot of virus in you, the virus is attacking you, and you are fighting back, that process produces symptoms inevitably. It's not just occasionally. It must always happen. And so all people who are very good sources of infection are ill. So the whole idea of asymptomatic transmission, I would think if it occurs at all, it's like 1%, or 0.1% as good as a strong infectious case. So by the time we got to about the third main theme of this pandemic, and how to control it, I knew I was being lied to all the time by government scientists, their advisors, by ministers, people on the TV, and I'm afraid that impression has simply firmed up as time's gone on. And so it's all about control. Obviously, I have my own thoughts about what that control is going to be used for. And I certainly want to communicate that to your listeners and viewers.

I remember one of the things I started doing early on, because I understood it quite well, was to publicly criticize the PCR or Polymerase Chain Reaction test, because I knew enough about it. Not that I'm a molecular biology expert, but I've hired people who are, and you know, I understand how PCR works, this idea of developing primers, bait, as it were for the thing you're trying to detect. And then to amplify it repeatedly, potentially up to a trillion-fold. People will be pretty familiar I think with the idea of DNA testing that will be used for forensic purposes. And I point out to them that the PCR test uses most of the same technology. And imagine if you were preparing for a trial, and you were able with your attorney to show the judge the conditions under which PCR testing was being done. Relatively inexperienced lab staff, doing hundreds of thousands of pipetting actions a day in the same laboratory. And you said, look, Your Honour, you know, my client sample is one of those on the bench, there might be cross contamination, and that I suspect it's inevitable, but you'll get the result shortly. I mean, the judge would just throw the entire evidence set out of court and rightly so. But it's the same technology that's being used to work out whether your sample or that of a family member or someone in your community is or is not positive for this virus. It's completely fraudulent the way it's being done. You simply cannot run a technique like that at industrial scale and expect the results to be meaningful. And they're not. I don't think they've ever been meaningful.

One of the frauds our government and the people they hired to run the testing have done is they refused to entertain the idea that there is something called a false positive rate. I assure you, if you run any diagnostic test repeatedly, sometimes there'll be a positive result when there's nothing in the sample. That's called a false positive. False negatives also occur. But let's focus on false positives. We don't really know whether that's going to occur half a percent of the time, 4% of the time. This is enormously material to telling you whether there's lots of infection in your community, or pretty much none at all. But you will find nowhere in the world has anyone measured and released, often, this what's

called operational false positive rate. You should disregard all announcements about case rates in your community, because they're completely fraudulent. You cannot run a medical diagnostic test, without those checks being run in situ, every time.

And so I argued repeatedly, and what I was finding I was getting was censorship, insults. I mean, really quite unpleasant stuff on things like Twitter. People would be assigned to come and write up insulting and bad and hateful things about you. There was no way people were willing to engage scientifically. And I'll tell you what that did. Very quickly, it caused less confident and less angry people to stop commenting. And I think that was the point of it. So as time went on, I found when I talked to fellow scientists, often retired scientists or academics, people I grew up with who now hold chairs in immunology, they would agree with me privately that PCR testing as it was being done was completely nonsense and fraudulent. That the attribution of deaths in the way we've done it is completely stupid. Lock-down clearly was irrational, and probably killing lots of people. But the difference was, they were not willing to say anything in public, because they said, it's been intimated that the authorities in the university don't want us to challenge the government narrative or that of its advisors, so we're not. And that's what happened, we ended up with people looking the other way. And the more they look the other way, the fewer people there were like me. And so eventually, I became noteworthy for that bloke that keeps saying things, that scientist that keeps challenging. Then it was quite easy for them to write smear stories about me, call me an anti-vaxxer, you know, suggest I'd lost my mind or gone off the rails because, you know, if you're a viewer, you don't have to listen to me if I'm any of those things. But I assure you, I'm none of those things.

And the reason I'm commenting is because I believe it's not just my life, but more importantly, that of my children and grandchildren that is being stolen from us by a systematic process of fear and control that's going to culminate in I think some very horrible times, and I'm desperate to wake you up. So when your government lies to you once or twice, we're probably quite used to politicians, occasionally telling white lies, and we kind of let them. But when they lie to you about something technical, something that you can check, and they do so repeatedly, over months, and they do it over many, many elements of the same event, please, you've got to believe me, they're not telling the truth. And if they're not telling the truth, that means there's something else afoot, and I'm here today to tell you that there's something very, very bad happening. And if you don't pay attention, you will soon lose any chance to do anything about it. And don't say you weren't warned, because I've been warning people as long as I can, and as hard as I can that you can still right now, take your normal society back. You can take it back tomorrow. You don't need masks, they don't work. Forget lock-downs, they never slowed transmission, which took place mostly in institutions like hospitals and care homes. You don't need to be vaccinated by inadequately tested and somewhat dangerous, gene-based spike protein inducing proteins. And you don't need to do what you're told by corrupt scientists who are apparently

advising our government. If you don't do that, in the next few weeks, it will be over I believe, if we get to a point of a so-called vaccine passport, I think you will have lost chance to take it back and you will regret it.

Government policy from the beginning – before even the virus arrived in our country – has turned decades of understanding of how to protect people from infectious diseases on its head. So we've never used lock-down before. And the good reason for that is it's not effective. I've just explained that you need to be symptomatic in order to be infectious. So what we do is we quarantine the sick. We've always done that. We've quarantined the sick because that's how you avoid infecting the wider population. So the idea of quarantining the well – this so-called lock-down – is a new invention, and it has no foundations whatsoever, either in science or in the history of controlling epidemics. Also, mass testing of people without symptoms, has no underpinning science at all. And it's just a way of frightening people. And this idea, for example, that you can be ill, even though you have no symptoms, and you can be a respiratory virus threat to someone else, even though you have no symptoms, that's also invented in 2020. There's simply no history of it. And it defies common sense as well. So most people probably are aware, when I tell them, you've got an incredibly good facility for noticing, as you walk towards somebody, whether they represent a health threat to you, you can tell just from the way their posture…how they're moving, you know, have they got symptoms? Eyes, nose, and so on. And if they do, you instinctively move around them. And if you think about it, that goes right back to prehistory, where one of the things that could kill you in wintertime, would be catching a respiratory virus, perhaps being disabled for a few days, that might be enough to kill you. Even if you were fit and well, that might be enough to kill you. And so it's a strong, evolutionary advantage for us to be highly aware of whether or not someone represented a threat to us. And the fact that we're very good at that, I think should tell you that they are reliable guides as to whether someone is a threat to you. So if they're not symptomatic, they're not going to infect you with flu. They might stab you, or hit you on the head, but they're not going to give you a chest infection that could kill you.

And yet time and time again, you're locked down, asymptomatic transmission, use of high multiplication, molecular biology tools, just over and over again, wearing masks. All of these things have either never been used before, or we already knew that they didn't work. And so I'm just piecing them together. You can go and check these things in five minutes if you haven't done already. But when the government lies to you for a few weeks, and then it extends to a few months. And then for over a year. You know, come on, this is a respiratory virus they say that's slightly worse in the elderly and already ill, than is flu, it's definitely less serious to those who are younger and fit, than is influenza. That's clear from the published literature of COVID-19. So why is it you're still hiding from a threat to your health as say, a working age population is less of a threat to you than influenza.

And you're still being told to run away and hide, after, I don't know, 15 months or 14 months, something like that, you must know that this is completely inappropriate. And something else is happening. But the point is, I am a scientist. I'm not any good at what I'm doing right now. I have no training whatsoever about how to talk to people who are not scientists. But I would say I'm a professional scientist, I've done very well. I've been, you know, really enjoyed my career and I've done well. No one is paying me to do this. I'm receiving absolutely nothing except criticism, social isolation from my peers, so what I will tell you, the reason I think you can trust what I'm saying is sincere, is that I'm paying to do this, right. I have lost work. I have had people that I've known for decades no longer want to speak to me. So I'm very sincere in what I'm doing. I'm warning you, that governments around the world and certainly yours locally is lying to you in various ways that are easy for you to establish. If you choose not to do that, there's nothing someone like me can do about it. Okay, you've been subject to propaganda and lies by people who are very well trained in how they do that. And I'm a complete amateur. So I'm simply telling you, that if you want to check any one of the things I have said, you will find it to be true. And I would point out to you that if you find one thing your government has said, which is clearly not true, I ask you this; why would you believe anything else they've told you? Don't you think that retired ex-Pfizer guy might have something after all? If I can show you, and I'm going to show you a few things that you can go and check. And if I'm right – and I am – then I beg of you to no longer assume what you're being told is true. That's the best I can do for you. I can't overwhelm. I can't sweep away a year of highly, accurately done propaganda by people who are lying to you. But all I can do is point out that they're lying to you. And we will go through a number of examples. And it's really in the end, it's up to you. If you would like to stand behind the desk called comfortable lies, there's absolutely nothing I can do to stop you. But if you would like to go to the desk called uncomfortable truths, which is the one I'm sitting behind, then welcome. And I'd like to help you.

One of the reasons I went into the commercial sector early on, was I wanted to do applied research. I wanted to be part of teams that would find hopefully find new cures, very much. I've always liked applied research, how things work, why they sometimes don't, what we could do about that. That's, that's the love of my life. But I had some peers of mine who wanted to do blue sky research. And back in the 80s, I guess they could do that, they could maybe get a petition to university and apply for grants. And then they could literally pursue things they thought were interesting. And if they made good progress, that would often attract more funding, so they were driving the research. Pharmaceutical industry, now as much as it ever was, still wants to pursue applied research. So some of the methods have changed. But the objective is pretty much as it was when I joined it in the 80s. But my academic friends report things are very different for them in universities. These days, the major funding bodies are still governments, but they tend to decide directional themes, often agreed internationally. And basically, if your research falls into one of those themes, you might get funded. And if it doesn't, you literally will be starved out,

because the only other source of funding are large, private institutions. So in Britain, for example, biggest one is the Medical Research Council, which is basically public money. And the next one is the Wellcome Trust, which has a very large endowment, and is used to drive research that's of interest to its management. And so, basically over time, and more recently, academic researchers pretty much have to toe the line. So if there are certain thematic areas that are being pursued by private funding, or endowments and scholarships, and so on, that comes from private foundations, those are the areas you have to work in. And it becomes quite difficult. Independent research is not only not supported, it's often not tolerated. And that makes, I think it has made them very easily persuaded, should we say over the last year to do what they are told.

And, most importantly – I've spotted this many times – they won't contest the COVID narrative. So over the last three months, I've spoken to eight professors at UK universities, whose discipline includes immunology, and I've discussed with them what I'm going to tell you about virus variants. And they've all agreed with my interpretation. None of them will say anything. And it's because I won't get a grant from the Wellcome Trust or the Medical Research Council as suggested. I won't get grants if I speak about this stuff. So I want you to know that the academics in your country are easily pushed around, frankly, by both politicians and people with lots of money. Then, in summary, the main change I've noticed over the last probably 40 years really is that university research has moved away from being directed mostly by the head of a department and individual researchers. And to be now much more directed from the centre from governments and from those that provide most of the grant funding and it's to be regretted, I think. There are obviously some advantages. It means that the resources of a country do get focused in certain areas, and who's to say that they're not the right ones? But I think the key thing to note is that the academics are no longer independent. So if you expect a university professor to be knowledgeable, yeah, they probably are. But if you expect them to be honest and independent, then you're naive. Because they've got to pay attention to where they're…who's buttering the bread, who's providing their funding. And they're not able to be independent anymore. Probably the only people you're going to find truly independent are former biotechnology CEOs, people like me. So I'm not a member of any club. Nobody pays me. And maybe some retired academics, most of them still won't speak out, because they still have connections to their old departments, they might have an emeritus position. So there are very, very few truly independent people and the rest are, you know, subject to the influences you would expect if money comes from a very small number of sources. And it's quite different from a few years from a few decades ago.

So one of the really seriously upsettingly, misleading, kind of things that you hear very often is the implication, or perhaps even the statement that what gives you immunity to something, some infectious diseases is whether you've got antibodies to that thing. And I think they have done that, because most people think that antibodies are what confers

immunity. And certainly, antibodies are quite important against certain infections, certainly bacterial infections. If you don't have antibodies, it can be very difficult. That's not the only part of your immunity. And importantly, immunity to viruses doesn't really rely on antibodies at all. And I'll just explain why that is. Viruses are really tiny things really tiny. And they're business is to get as quickly as they can inside your cells. So they bind to a receptor on the surface and inject themselves into your cell. They're inside. Antibodies are big molecules, and they're generally outside your cells. So just think about that for a moment. Antibodies and viruses are in separate compartments. The virus is inside the cell, the antibodies are outside the cell. So I'm not saying antibodies have no role. But they're really not very important. And this has been proven, there are some people in whom a natural experiment has occurred, they have a defect and they actually don't make antibodies. But they're able to fight off COVID-19, the virus SARS-COV-II quite well. And the way they do that is they have what's called T cell immunity, cellular immunity. And there are cells that are trained, as it were, to detect virus infected cells, and to kill those cells. And that's how you defend yourself against a virus. So all of these mentions of antibody levels, it's just bunk. It is not a good measure of whether or not you're immune. It does give the idea that it does give evidence that you've been infected. But their persistence is not important to whether you've got immunity. And so I feel I've noticed the emphasis on antibodies, I think is really a psychological operation to convince you, member of the public, that you do know that it's antibodies that confer immunity. And so when they fall away, well, you must be losing immunity. I'm sorry, it's not true. There are multiple arms of your immune system. And what's almost never talked about is T cell or cellular immunity. It's not a new thing, either. We've known this for decades. So it's not like, ah, maybe there's something about T cells. It's being implied that T cells are a kind of recently come on the scene. And maybe there are questions about how important it is. Absolute rot. We've known about T cells for decades. They were clearly in my undergraduate textbooks, and we've known about their importance in defending you against respiratory viruses, since probably the 1970s, certainly the 1980s. So don't believe anything where people suggest to you that their role is uncertain. It's just bullshit. We've known for a very long time that they're absolutely central.

And, you know, I would like to explain why the virus variant story is just yet another lie. And it involved T cells. Your immune system has multiple components to it because you are susceptible to infectious threats of various kinds; parasites, fungi, bacteria, viruses, those will be the main categories. Well, obviously, they invade and threaten you in completely different ways. It would not be surprising then to learn that you've got, four or five different arms of the immune system, innate immunity, mucosal antibody, T cells, and complement. There are all of these different, wonderful systems that are integrated one with another, because it needs to defend you against all sorts of different threats in the environment. And what I'm telling you is that the emphasis on antibodies, in respect of respiratory viral infections is wrong. And you can establish that quite easily by doing some

searching. And therefore, once you've established that for yourself, then you'll probably realize, well, why do they keep telling us about antibodies when they're probably not very important at all. And why aren't they talking about T cells that are well established to be that which maintains the defense of your tissues? When this virus was first being talked about before it kind of landed in each of our countries? I think we were given exaggerated suggestions of exaggerated risks. You know, early on, people were talking about maybe 3% of people who were infected would, die which is truly awful.

Something like influenza, it's normally thought to be about point 1%, one in a thousand. But even that doesn't give you any idea of your relative risk. So let me just tell you – you know this anyway – the older you get, the lower the chance that you'll make your next birthday. So if you're 60, as I am, statistically I've got about a 99% chance of making my next birthday. But by the time I reach my mid-80s, it's maybe only got about a 50% chance of making my next birthday. And inevitably, you reach a point where you don't turn the cards over. If you think of the risk of dying for having been infected by influenza, frankly, the older you get, and the iller you already are, the greater the risk that that will be what carries you off. Something has to, and this virus that causes Covid 19, is pretty much like that. It's just it's a slightly bigger risk for you. If you're above 70 and already ill, it is a bigger risk to you than flu. Not a great deal more, but it's slightly worse. But the corollary is also true. If you're younger than 70, and you don't have prior illnesses, it's less of a risk to your health than is influenza. So it's just absurd that you should be happy or willing to let your economy and civil society be smashed for something which represents for almost everyone working a lower risk than influenza. But that's true. Given this virus represents at worst, a slightly bigger risk to the old and ill than just influenza and less risk – a smaller risk – to almost everyone else who's younger and fit.

It was never necessary for us to have done anything. We didn't need to do anything, lockdowns, masks, mass testing, vaccines even. There are multiple therapeutic drugs that are at least as effective as vaccines are. They're already available and cheap. So inhaled corticosteroids that are used in asthma, reduce symptomatology by about 90%, a study that's published this week. An off-patent drug called Ivermectin. It's one of the most widely used drugs in the world, is also able to reduce symptoms at any stage of the disease, including lethality by about 90%. So you don't need vaccines, and you don't need any of the measures that have been introduced at all. So it's not just a shade of opinion here, I would say objectively, none of those things were ever required. And yet, governments and their scientific advisors have lied to us for a year. And I think they've just produced mayhem, potentially fatal damage to our economies and civil societies.

So of the things that your governments and advisors have misled you about, I think most severely, and honestly frightens me – and it was the catalyst for me making these recordings – is the issue of virus variants. And the following issue, the related issue of top-up

vaccines or variant vaccines; so let me just quickly explain, this is really, really critical to your very survival. It's quite normal for RNA viruses like SARS-COV-II when it replicates to make typographical errors, that's what it does, typos. It's got a very good error detection, error correction system, so it doesn't make too many typos, but it does make some, and those are called variants. But it's really important that you know, that if you find the variant that's most different from the sequence identified in Wuhan, that variance and most distant is only 0.3% different from the original sequence. So I'll say it another way. If you find the most different variant, it's 99.7%, identical to the original one. And I can assure you – and I'm going to explain why I'm sure – that that amount of difference is absolutely not possibly able to represent itself to you as a different virus. That's what people are leaving you to think, that maybe variants will escape your immunity, either caused by a vaccine or by natural infection, and it's an absolute lie. So why do I know that? Well, 17 years ago, 18 years ago, there was a virus called SARS, which is actually very similar to SARS-COV-II. It's 80% similar to SARS-COV-II and there were some experiments done last year, where they found people who'd been infected by SARS 17 years earlier, and asked them to donate blood, and they did. And there were tests done on the cells in that blood and they wanted to know; were the circulating immune cells still able to recognize SARS 17 years later? And they were. They all still had memory T cells circulating around their body. That's great. That's what I would have expected. They also did a really important experiment. They showed those same people's T cells, the new virus, SARS-COV-II, and unsurprisingly to me, they recognize that new virus, and that's because the new virus is 80%, similar to the old one, 20 percent different. So just to say again, a 20% difference was not enough to kid these people's immune system that it was a new virus. It easily recognized it as a sibling, a brother, a cousin of something they'd conquered already. So when your government scientists tell you that a variant that's 0.3% different from SARS, could masquerade as a new virus and be a threat to your health, you should know and I'm telling you, they are lying. If they're lying – and they are – why is the pharmaceutical industry making top-up vaccines? They are making them. You should be terrified at this point, as I am, because there's absolutely no possible justification for their manufacture. But they're being made, and the world's medicines regulators have said, because they're quite similar to the original vaccines, the ones that are being given now, we won't be asking them to do any clinical safety studies. So let me just say again, the variants are not different enough to represent a threat to you, so you do not need top-up vaccines, yet they are being made, and the regulators have more or less waved them through. I'm very frightened of that. There's no possible benign interpretation of this. I believe that they're going to be used to damage your health and possibly kill you. Seriously. I can see no sensible interpretation other than a serious attempt at mass depopulation. This will provide the tools to do it. Plausible deniability, because they will create another story about some sort of biological threat. And you'll line up and get your top up vaccines and a few months or a year or so later, you will die of some peculiar, explicable syndrome, and they won't be able to associate it with the top-up vaccines. But that's my belief, that they're lying to you about variants, so they can make damaging top-up vaccines that you

don't need at all. And I think they will be used for malign purposes. And if you don't wake up, that's what's going to happen I think during next year. I have heard a lot of people worry about the origins of this SARS-COV-II. I don't have a particularly strong opinion about it because the evidence, looks both ways and so on. But it's very important that you know that it's not true that we don't know a lot about it. We know an enormous amount about it. It's very similar to a virus that people have been infected and survived before. In fact, it's a lot less lethal than SARS, it spreads more easily, but it's a lot less lethal. And we know that the people it injures and kills are only people who are elderly, and or ill, usually both. And so we're talking about less than 0.1%. It's been moving through our communities now for well over a year. It's not some mysterious thing that's going to just leap out from behind the cupboard. It's a straightforward, respiratory virus. Most people have completely ample immunity to repel it. And I'll tell you a few things about it. Once you've been infected, you're immune. There's no uncertainty about it. It's been studied hundreds of times now, lots of literature has been published. So once you've been infected, often you'll have no symptoms, you're now immune, probably for decades. That would be my default expectation for decades. It's simply not true that the variants that it throws off as it replicates are sufficiently different from each other to represent any threat at all. It's not even unlikely, it's impossible, based on the thousands and thousands of variants that have been formed. They're all very, very similar to the original. In fact, I joke about them and call them samiants. Because they're so similar, you might as well see them as the same.

So you've been infected, you'll mostly survive unless you're very close to death anyway, you're then immune probably for decades, possibly for life. It's not true that the variants represent any kind of threat. It's not true that you'll need a top vaccine. Most of you don't need a vaccine at all. Most of you would be well advised to stay away from experimental vaccines, unfortunately, that do come with a blood clot risk. Why would you take a risk with your health for something that's not a threat to you? So I'm particularly troubled at the moment by the repeated mentioned in the media and by all sorts of people of so-called vaccine passports. Now, the only reason we've ever had passports for certain for immunizations to prove you've been immunized against certain diseases are those when the disease is extremely lethal, something like yellow fever, and when you might otherwise bring back to a community that has no immunity whatsoever, a really dangerous pathogen. So if you want to go to certain parts of the world, where yellow fever is present, you need to be vaccinated, one, to protect you from a disease that might kill you, and two, to make sure you don't bring it home to people in a community where there's no yellow fever, and so of course, there's no immunity to it. You might have a little card that says, you were immunized once for life for yellow fever. That doesn't tell you you need a passport against a common and garden respiratory virus. Let me just explain why. If you're an elderly and vulnerable person, you've chosen to be vaccinated, you are now protected against that virus. It doesn't matter what anyone around you is doing, whether they've got the virus or not got the virus, you've got your armour on. You don't need to see anyone else's

vaccine status. You don't need to know anything about them. If you're a younger and fit person, you've looked at the literature and decided rightly, you don't need to take a vaccine because you've got perfectly good immunity of your own, you too don't care what the immune status of anybody around you is. So you don't need to know vaccine passport status. So I've just explained, someone who's been vaccinated doesn't need to see someone else's vaccine passport. And someone not vaccinated doesn't need to see anyone else's vaccine passport, they don't provide you with any safety at all.

They're not required at all. What they provide, though, is complete control over your movements, to whoever controls the database that your vaccination status is connected to. Let me just quickly explain it. I hope you grasp this. Because this is not optional. This is what's going to take over your life in a way that George Orwell in 1984 didn't even dream of. Imagine you've been vaccinated, and you've been awarded a vaccine passport on an app. It's going to be the world's first database that contains your name, a unique digital ID in the same format as absolutely everybody else on the planet on the same database. And it'll have like an editable health related flag that will say, thumb up that you've got you've been vaccinated or maybe a red flag if you haven't been. Now, the algorithm that rules, that works out what you can do with or without your vaccine passport, that's what's going to control the rest of your lives until you die. So you might think, oh, that's an exaggeration, they're only going to need vaccine passports perhaps to enter a sports ground or a big public building like a museum. That's that might be true initially. But imagine if they say, now you need your valid vaccine passport to enter any large, shopping complex. And then every large store. That's going to provide coercive pressure on people who've chosen not to be vaccinated. They'll have to get vaccinated. Now, it's an illegal thing for your government to coerce you to accept any medical treatment, and it's against the Nuremberg Code that was put in place after the Nazi doctors were convicted of performing experiments on people, including lethal experiments.

That prevents you coercing people to take experimental therapies because now they're taking part in a medical experiment against their will. But if this vaccine passport system is up and running, and you're told say that you can't enter any shop at all without beeping your vaccine passport, now you can't enter any retail establishment, you can't control what those rules are. You've no idea who's setting those rules. Don't allow this system to come into force. It's going to be used to coerce you. And let me just give you another example. You know those variants and the top-up vaccines I spoke about? I believe if you allow vaccine passports to come into force, you'll be pinged one day, and it'll advise you to go to the medical centre to have your top-up vaccine. And if you chose not to, your vaccine passport validity will expire. Which means you won't be able to enter a shop, you may not eventually be able to use your bank card. All somebody needs to do is set a rule that says, after a given date, before any bank card can be used, a vaccine passport has to be beeped onto the card reader. So just take it from me, you don't need vaccine passports.

They provide nothing whatsoever to you or anybody else in relation to safety, but it will give away to whoever controls that database and the rules, complete control over everything you do.

Let me give you one last example. You're owning this vaccine passport and it pings, and in addition to advising you you need to come to the health centre for your top-up vaccine, perhaps your second one in a year, it also advises you that you need to bring your small grandchild down because your daughter hasn't brought the little lad in yet. And they say if you don't bring that grandchild down, your vaccine passport will expire and that of your daughter as well. Now, try resisting that. Simply think. This system is being put in place using lies. And it's being put in place using lies for some purpose, and I believe that purpose is complete, totalitarian control, and I think the purpose of that is going to be mass depopulation. I can't think of a single benign interpretation for the simple creation of these top-up vaccines, let alone the lies that surround them, and I'm absolutely terrified that the combination of vaccine passports and top-up vaccines is going to lead to mass depopulation, deliberate execution potentially of billions of people. You can stop it once you've heard what I'm saying. Even if you like the idea of vaccine passports, put the damned thing in place using written records or something. Something that'll allow you to show you've been vaccinated, but do not allow it to be on an inter-operable, global, fixed format database '' because that will be the end of human freedom, and I just see no way of recovering from that once the system's up and running.

The frustration I feel is that we simply can't get this information to very many people and very few of the people who'll even hear this will do anything with it. That's why I'm literally at the end of my tether. I've tried and tried and tried and I can see that the people running this have played an absolute blinder. They must have thought about it for some time, and basically, they've used a relatively small number of lies which they've chosen to be quite close to something that's plausible and then they've just pounded this script of half a dozen points relentlessly. And the only other thing they've needed is to frighten people to death and then censor everybody else. That's all they've needed to do really. Simple story, repeated, censorship and fear.

And here we are. So it's just remember we're subject to censorship, so of course, I've been busy as hell and of course, you'd never have heard of me. This is the problem now. Almost no-one has heard of me or anyone speaking similarly. Almost nobody. It's just amazing that…but it just shows how…in fact, one of the reasons I'm very disappointed is I've had a sort of realization over recent weeks that it really doesn't matter what we do. If we do the things that those operating this global fraud expect, we will lose. They already know we'll do these things. They've mapped it out and they've worked out what are the things that are most likely to happen? It'll be, well, there'll be some noisy individuals. Well, as long as we can control the amount…the share of voice they get, then we don't need to be

worried about them. And I'm worried that I've done absolutely nothing that differs from what they have already modeled and war-gamed and that did not work, or they wouldn't have moved off with this plan. So unfortunately, the conclusion I've got is collectively we need to do something unexpected. And if we do expected things, we will lose. That's a bit pessimistic but forgive me, I've been a research scientist all my life, not a propagandist. It's only recently I've realized that I'm in a trap really, that I'm playing my role, almost like an icon in their game. I'm a representative of a tiny number of people who'll be noisy, and they're fine with that.

Government knows who I am. I know people in the government. And I've been advised they know who I am. But they won't do anything because I'm ineffective. They haven't left me alone because I'm off target. They've left me alone because they know I can't reach anybody. I briefly worked with the UK Chief Scientific Adviser, Sir Patrick Vallance, when he was – as I was – researchers in the Wellcome Research Labs in about late 1980s. I know who he is, he knows who I am. But they leave me alone because I'm ineffective. If I become effective, that will be different. But I think they're not worried because they have complete control of the mass media, TV, radio, newspapers, internet. And the only people who'll see me are really people already looking for information. So I doubt I'll convert very many people because people who need to be converted are not looking. They're looking at main media, and that message is completely controlled and hermetically sealed. So if we carry on doing the same things, we're just playing out our expected role in a simulation that whoever's running this has already thought about. So I don't want to worry you, but it's probably true, isn't it?

My hope is that for example, hope the United States – God bless its federal system – you've shown diversity. Some states have done different things from others. And so I think it's quite useful because the people not just in the US but outside it can see that it hasn't made any difference if you're South Dakota or Florida, or California. It's all pretty much turned out to be the same. So the measures that have been put in place are unnecessary and have made no difference except to worsen the outcome for the people who live in those states. It's destroyed the economy and civil society and probably cost people their lives by depriving them of ready access to normal healthcare, which has been smashed by our responses to this virus. But in the European countries unfortunately, in every country, whatever set of measures they chose, they were uniform. North, south, east, and west, and so we never had any opportunity to see what would have been the counter factual, and so each country's pretty much hermetically sealed and whoever's running this has complete control of the message and the medium.

Something that's very important for you to know. The vaccines that – these gene-based vaccines – they're not approved by any medical authority like the FDA, the European Medical Agency…Medicines Agency. They are available only on what's called an Emergency

Use Authorization. So if there wasn't an emergency, they simply couldn't be administered at all. But it's very important that you know that they are emergency use authorized only. That is, we don't know very much about them. We don't know anything at all about the potential for long-term side effects. So if it turns out for example, that they induce cancer in one in ten people – I don't think that's likely – but since we don't know anything, anything's possible, right. So it's inappropriate to be giving these to more than the most vulnerable people. So when they first were emergency use authorised, and they were to be used only in the elderly and already ill, I could understand why they were doing that. But when in the UK the government said, now we've got the list of everybody else all the way down to the age of 18, then we want all of them to be offered the vaccine and it's clearly more than an offer, and now they're even running studies in children who don't suffer from Covid 19. Not a single child in the UK who was well has caught this virus and died, not one. But there are ten million children under the age of 10 who I'm confident they're going to be wanting to vaccinate. Now, this is completely wrong. There's simply no basis for doing this. It will result in injury and death of some people. Every medicine has some side effects. You would never use it on scale unless the people receiving it were at risk of the illness, and they're not. So you'll notice, if you ask some friends who've been vaccinated, ask them were they informed in writing that these are experimental medicines that have not yet been approved? If you weren't, you were administered an experimental agent without your consent. That is contrary to the Nuremberg Code, a code put in place after World War II, recognizing the foul, human experiments performed by Nazi doctors. The Nazi doctors, by the way, were pretty much all hanged for their crimes against humanity. And I'm sorry to say that NHS doctors, who are administering these agents to people who are not at risk from the virus and are not telling them that they're experimental, are also breaching the Nuremberg Code, and I believe they're doing it knowingly. And I think there should be a Nuremberg II, and I think those physicians should be tried on those charges and appropriate sentences handed down. So if you're one of those physicians, I hope to be around to see you in the court.

This is certainly a time for people who know or suspect that what is being said to you by our politicians and scientific advisers is wrong. It's time to stand up and say, no, withdraw your consent. There's something awful happening. You know it. Those people of you who are listening to me, you've suspected for some time that this isn't right, don't look away. Don't look away, it's time now to find other people like you who are not quite sure but really suspicious. Find somebody else and talk to them. Because if you find someone else who thinks, God, I'm glad you said that, because I've thought this is lies as well, then the two of you can go and find a third person and just…once you've woken up and realized you're being lied to, it's very, very frightening. You don't have to do anything with that at first except don't forget that realization, find someone else who also feels the same. Don't be afraid to be a little bit wrong. The people around you don't know any better, do they? If they're experts – well, they're probably not going to be – then they would be able to

tell you what I'm saying is true. And if they're like you, suspicious, but they're not really experts, then they're not really going to be able to tell you you're wrong. So if you think something's wrong, you're right. Go and find someone else who feels the same. Never look back and accept what the government's telling you. It's your last chance to rescue your own liberty and that of your children and grandchildren. It's going to vanish. So if you're suspicious, if you're frightened, if you think something's up, you're absolutely right. This is our last chance. I think we're in the last few weeks in the UK of liberal democracy and it will then vanish forever. So take your courage in your hands. The worst that will happen is someone will laugh at you. It's not a big deal, is it? Find someone else who's also suspicious, and if you find that person, go and find yet other people. You don't need to do anything violent. You just need to say, do you know? Stop. I'm withdrawing my consent. This is a stupid experiment. We've had enough now. End of story. Go back to normal life. That's all you need to do. At the moment, it's so astonishingly simple. Normality is literally at arm's length. But it won't be soon. If the vaccine passports system is voted in by our corrupt people in Westminster, who are also stupid. That will be the end of liberal democracy. And I don't think there's any way out of that.

---

## "We'll be standing at the gates of hell."

~ Dr. Michael Yeadon, 2021

# An Urgent Warning To The World

From Dr. Mike Yeadon • April 9th, 2021 • At Canterbury, England
Former Vice-President & Chief Science Officer
Allergy and Respiratory Research Unit
Pfizer Pharmaceuticals (16 years)

Transcription by Jeff Prager
Interview by John Kirby

***Dr. Yeadon:***
My name is Dr. Mike Yeadon, I'm a veteran of the pharmaceutical industry, I have a degree in biochemistry and toxicology, a PhD in Respiratory Pharmacology and 32 years of leadership in new drug discovery in allergy and respiratory, first in a number of large companies, most recently Pfizer where I left 10 years ago as Chief Scientist and Head of Allergy and Respiratory Research and over the last ten years I've acted as an independent consulting to several dozen start-up biotech companies and was happy to be able to found and run successfully to completion my own biotech that was then acquired by Novartis.

I'm an independent now but I'm broadly experienced in the required sciences, specifically the life sciences required to understand disease pathology and potentially ways to intervene beneficially in those diseases.

***John Kirby:***
I guess it's safe to say that you're not anti-pharmaceuticals as a general rule. You've been developing these for a number of years. Recently you authored or co-authored a letter to the European Medicines Agency. Can you tell us what the substance of that letter was and what your concerns are?

***Dr. Yeadon:***
Yes. So of course I'm pro-novel medicines. I'm actually pro-safe and effective medicines and of course like anyone on that industry I'm very troubled if something that doesn't work or is not safe is being rolled out and that's my concern. So turning to the letter I co-authored with Dr. Wolfgang Wodarg early n December 2020, we wrote a Petition really to the European Medicines Agency because we were concerned that these gene-based vaccines were moving at too great a pace, they had not acquired a sufficient safety data base to allow these vaccines to be widely rolled out. We anticipated, and as it turned out correctly, that in my view completely reckless dispensing of these novel technology vaccines would go ahead so what was the substance?

Fundamentally these are new technology products, there are no products of this kind where they use a gene, sometimes a virus, to bring the gene inside the cells of the human body, get those cells to manufacture part of the pathogen and it's that to which you respond to make an immune response to become vaccinated.

Normal vaccines use an already dead pathogen so this is quite different in that the genes for the pathogen are what's being injected and they're inviting your body to manufacture part of that pathogen. So I would say the unknown unknowns were of significant concern for us because we simply don't know what will happen downstream of that event, not being done before. At the moment, I'm seeing with the way these vaccines rolled out with the assurance that they're save even in the short term but completely ignoring potential for longer term side effects.

Just imagine a scenario where 1% of people after a year or two get some unexpected problem, what are you going to do? You've already given it to the majority of the population. So when we rolled them out, these vaccines, to people who are not at any risk from dying from the virus you know something very bad is happening. So yes, we wrote the letter to the European Medicines Agency. Our broad concern was new technology, you need a good safety database, we didn't have it, be careful, and then I had a list of specific concerns that people have focused on but they're just minor details, the main one is we don't know what happens in the long-term with these new technology products. That's that.

### *John Kirby:*

I don't think people recognize, because I know in the United States, the FDA, Food & Drug Administration has given these vaccines only what they call Emergency Use Authorization. Is that the case in Europe as well, they've not been officially approved by the European Medicines Agency (EMA)?

### *Dr. Yeadon:*

Yes, none of these gene-based vaccines have been through the normal research and development phase to completion. In fact the one that's being used in the United Kingdom at the moment from Pfizer Biontech, AstraZeneca Oxford, and I think the Moderna one now just arriving, all of these are still deep in their pivotal or Phase 3 clinical trials and they don't finish for roughly two years. And you're pointing out to the public, they're, you're not just playing around, those two years are in order to gather evidence of robust continuing activity, k what you want to happen and also to check whether or not anything bad happens. And we just don't have that data.

They've been given only Emergency Use Authorization. They claim it's an emergency but it's not obvious anymore that there is an emergency. There was perhaps a year ago. But in addition to that rather substantial question there are numerous other pharmaceuti-

cal treatments like Ivermectin, Hydroxychloroquine, Vitamin D, Corticosteroids and all of these have been battered out of existence by I believe criminal people working for or around the government. Because if any of those things were approved, even off-label, it would undermine the rational for these vaccines that would then have to wait until they finish their normal clinical development. So we've only got them under emergency and it's only an emergency because they say so and there are no alternatives which is also a requirement to get emergency use authorization because all of the viable alternatives have just been suppressed.

### *John Kirby:*

I wonder how this could happen because it feels like, I seem to recall there are provisions in international law against this. It seems like we are involved in what is effectively the largest Phase 3 Clinical Trial in human history and people don't realize that they're participating in a clinical experimental trial. As I recall the Nuremberg Code prevents this sort of thing. "Subjects of human experimentation are meant to be able to give their informed consent" and I'm not sure that they have and so, how can, what seems to me an egregious violation of international law that's been long-standing since the horrors of Nazi Experimentation, how can this be proceeding, how can so many governmental agencies all over the world be countenancing this? If you could explain the Nuremberg Code and what it entails.

### *Dr. Yeadon:*

Yes, I think that's a fair comment. It's like the largest Phase 3 Clinical Trial in world history. Yes, the Nuremberg Code was put together after the Nazi doctor's trials after the second World War in which a number of doctors were prosecuted for having performed experiments on, of course, unwilling human subjects. Some of them died and the court decided that these doctors should be, in many cases, subject to the death penalty and they were hung.

The Nuremberg Code was written after that designed expressly to prevent involuntary experiments on human beings without their consent. I've looked at the consent forms for vaccination, the ones that have been available to me … none of them mention that these products are still in the experimental phase. I'm afraid there is no question, they have not received regulatory approval anywhere, they didn't always say that they have but there's never a comment that these are experimental and therefore we don't know what's going to happen. We really don't know what's going to happen even at a population level. I think it's fair to say it's an experiment and you're part of it. So yes, people are being told things like this vaccine is safe, will you please come as soon as you're offered it and come get it. It seems to me that law and order has just largely failed in this country and of course I can't explain it. My answer at this point when people ask me is to say, my answer is, it's not my crime.

I've identified, along with other people that very, very improper, and I would say dark things are happening but as to why they're happening and who's driving it I'm afraid I don't know, it's not my crime.

### *John Kirby:*

Perhaps people supporting this vaccine roll-out would reiterate once again that this is an emergency. Can we just go over the reasons, perhaps starting with some of the other mitigation efforts that you've noted in the past were not effective and perhaps damaging, and as you mentioned, and perhaps we could reiterate, there are treatments, effective treatments. I happen to know that certain wealthy and various areas of the United States, hospital systems have been giving Hydroxychloroquine and zinc, they're been giving Ivermectin, steroids, etc., all with great success. So there are effective treatments available. How can we justify this as an emergency when even without treatments the survivability rate of this disease—COVID-19—is 99.7% if you're under 65 or 70 and not much less than that even if you're older and have co-Morbidities.

### *Dr. Yeadon:*

It's a great question. There may have been an emergency certainly in the Spring of the Northern Hemisphere last year although I wasn't an enthusiast of the so-called lock-down I could understand why terrified political leaders and their advisors might err on the side of caution. Nothing, in the UK at least, the United Kingdom, absolutely nothing, the government and their advisors have informed the public about any of the sort of key bits of information, not one of them has been true. It's not just the occasional slip. For example the preliminaries chain reaction or PCR, no one defines its rates of false positives. Every test produces some positives when the virus is absent. We know this. But the authorities running it simply refuse to engage with scientists who say what is that rate operation? You need to net that off. The gross. You just get abuse, trolling and eventually censorship. They also do not unify how many cycles of amplification, because it is an amplification technique, how many cycles before we all say if that's not positive then we'll say the virus is absent? It's just the Wild West out there so the number of cycles fail to define the false positive rate and from time to time some labs instead of using three probes or primers to identify unique spots in the virus—all three of which have to be positive to say yes, that's consistent with the virus, genetic information being in the sample—sometimes they'll use two genes, sometimes one gene and I'm afraid the unifying observation is that all of this cheating, this is cheating really, so to increase the number of invertacomas cases, that's not just a diagnosis, it also ends up being an attribution label so if a person should die within 28 days of a positive test, no matter how bad that test was they're called a COVID death.

I just don't believe anything like the number of people who are claimed to have died absurdly with COVID rather than of it, have actually died even with it let alone of it. So

everything we're being told has manufactured, or has amplified the harm and the psychological fear and harm from this virus, from top to bottom, so bad testing, lies about the idea that you can be completely symptom-free and yet represent an infection risk to people around you. That is a lie.

### *John Kirby:*

Can you speak to that a little bit more, you know this idea of asymptomatic spread is of course the whole reason why the world has masked up, locked down, social distancing, all of this stuff rests on that central premise that healthy people can make other healthy people sick. What do you say to that.

### *Dr. Yeadon:*

Yes, the concept of asymptomatic transmission, like you say, that someone who's apparently perfectly well can represent a health threat to another person who's perfectly well is simply not true. The total weight of evidence actually that was used to form this idea were I think 6 or 7 case studies. A case study is usually an observation of one person so that's the total data out of 7 or 8 billion people. Six or seven case histories where someone asserted that a person who was positive by PCR but according to the report had no symptoms managed to infect someone else nearby. When they infected them it was only then that they became PCR positive too. Now I think the vast majority of these were out of China, interestingly, and I'm afraid anything that's influential that comes out of research in China is approved by the party. I'm afraid that much is the way it's always been.

There was only one substantial claim for asymptomatic transmission in Europe and I believe it was a subject that had come from China and visited a number of engineering plants in Germany and it was claimed they infected a lot of people, even though they were quote "asymptomatic". But apparently very quickly after that report it was corrected that the person was actually heavily symptomatic and had been using over-the-counter medicine to try and get through their day so he really was symptomatic after all and just like someone with a flu or a cold they barreled on through their day and they just had managed to infect people.

I can explain to people very simply why it's not just my opinion and that of other people that asymptomatic transmission isn't true, I can show you by reasoning. In order to be a good source of infectious virus, say it's me, I have to have a lot of virus in my airway, I can't infect you with a distance if I've got a tiny amount. That's because the world's full of pathogens all the time and you're able to fight them off routinely, minute by minute, throughout your whole life. You have to have an amount, over an amount, such that it becomes an infective dose and that only happens if you're in close contact with someone who's emitting lot's of virus. In order to be emitting lot's of virus you have to have a lot of them in your body. If you have a lot of viruses in your body you will have symptoms. It's

simply not possible for you to have a high viral load and for that virus to be attacking you and you have no symptoms and for your immune system to be fighting back and protecting you and for you to have no symptoms. It's simply not possible.

There might be a brief period of a few hours when the virus is growing quickly, your body's just starting to respond, you might not quite notice, you might not feel 100% but you're not ill yet and that's called Pre-symptomatic and yes, I guess it's possible a few people were infected that way.

But the idea that transmission, a major contribution to epidemic spreading occurred in a person that was full of virus and had no symptoms, it's just bunk. And I'll just add one other thing that I think will chime with people. We are very good at noticing whether someone's a health threat to us, usually a respiratory threat to us. When you come up to a person, a relative or a stranger, without trying you've scanned them and you're aware. Is their gate normal, is the head normal, are they looking at you clear-eyed or do they look hunched and a little bit ill. And without thinking about it, if you don't know them and they look a little bit ill you will skirt around them. In a sense you're socially distancing, unconsciously.

And so the two things I've just said there, in order to be a good infectious source you have to be, yourself, full of virus and you will be symptomatic. The only chance you would encounter someone like that in your community I think would be still averted because if you saw someone stumbling around full of flu or a cold you'd think, "Oh My G_d, get around this person".

So it's my contention that there was almost no transmission in the community because there weren't symptomatic people, they would be feeling ill if they were in that situation so there were hardly any infectious contacts in the general community. And you know what, that explains why lock-downs, systematically across the world, haven't done anything. And that's because the places you do encounter symptomatic infectious people, or where they've no choice to be there, either hospitals or care homes or occasionally your own domestic environment. Everywhere else you simply won't find infectious sources so when you've locked down and smashed the economy, and civil society, of course you don't lower transmission. It wasn't taking place there. Obviously not, so that's where I am on asymptomatic transmission. But yes, you're right, it is a manufactured story and it was on that basis that we were all told to wear masks and which don't work anyway. Even if it was true, asymptomatic transmission, masks don't work anyway because they've been tested repeatedly over the years and they don't do anything against respiratory viruses and that was the justification as well for mass testing. Millions of people had no symptoms and of course as I said early on when you use tests en mass a fraction of them will be positive even when the virus is absent and if you don't take account for that you'll think, "Lo and behold, there's all these millions of

people who have this virus and they better be self-isolating for days or weeks."

This whole thing has terrified people and it's all a lie. I don't think a single fundamental sort of driving factor about this epidemic has been represented correctly. And it's obvious to experienced scientists like me and when I've spoken to lot's of my peers they agree. So it's not like I'm an unusual person in thinking as I do, what's unusual is that I have come out and said so. Most of my colleagues have more or less said my employer or my university doesn't want me to say anything that would be counter to the official line, so, I'm just staying quiet. Whereas I decided I wasn't going to do that because something very bad is happening and it's getting darker.

***John Kirby:***
Now I want to get back to this question of censorship and self-censorship but this idea that healthy people can't get other healthy people sick even, you know, OK, the few Pre-Symptomatic cases notwithstanding, there seems to be not just basic common sense to that idea but it seems that epidemiologists, immunologists, virologists, the world over, doctors, regular MD's, would understand that intuitively based on their experience and in so many ways. How can we account for the general silence of so many of your colleagues and the medical community in general?

***Dr. Yeadon:***
I can't explain why the vast majority of people who definitely know better have chosen to remain silent. I don't know. What I can tell you is anyone, me included, who've said things like I'm saying—there were problems for example with the PCR Test in the UK—and I would comment about it and write articles about it. What I did notice is that immediately [after] you did that and the more qualified you were the worse it was. You would be attacked, for example on Twitter and eventually on main media. So for example, last year the main UK broadcaster, the British Broadcasting Corporation, actually used well-known journalists to slander me in public. A lady called Emma Barnett who runs the Woman's Hour, podcast, I'll name you Emma because you named me, and she made some statements about things I've not said that slandered me and on that occasion I told her she better take that lie back or I would sue and they did indeed delete that portion.

So basically they intimidate you and they will use either, I think, employed people on Social Media, they do exist to attack you and sometimes professional colleagues one way or another just taking a different view and they will attack you and no one gets on any of the main media that doesn't have a view that accords with what the government is saying. I don't know whether they really believe it or not. I think some do and they're a bit thoughtless. But I think to answer your question, people were a bit uncertain whether they were going to say anything or not noticed that anyone who said anything got attacked, slandered, called a conspiracy theorist or a fool or wrong or a Covidiot, some-

one who puts other peoples lives at risk, the accusations were endless.

The thing is, I'm not doing this for money. I've suffered injury shall we say to my reputation and my finances for speaking out. But I'm very confident in my position. Once you've arrived at that view you know that attacks are manufactured. It's like they used to say about warfare, "When you're over the target, that's when the flack is heaviest." I think a lot of people—I'm not in their head so I don't know but I think a lot of people chose to say nothing out of self-preservation. Cowardice perhaps or pragmatically they realized they would just be destroyed. And that's that. I do think the origin in Britain, we have a regulator of broadcasting in this country called OffCom, Office of Communications or something like that. On the day of the first lock-down, March 23rd last year they issued a 4-page guidance that said more or less we expect all broadcasters and that includes radio, TV and newspapers, to not say things that contradict the position of the government or their authorized health advisors. Pretty much. It didn't quite say censorship but it said this is an emergency and it's not going to be appropriate for you to give the option of publicity to viewpoints that challenge that.

That still continues now and we're about, I don't know, 55-56 weeks into this emergency. So they laid the marker down pretty quickly and nobody on the main media pretty much said anything at all other than the governments official position. I think people noticed within a few weeks it was, that's not tolerated. So now we've had eleven and a half months of a single party line and anyone who says anything knows they'll be attacked. It's easy for everyone to understand why its continued. I actually am not able to answer your first question—why is it that people didn't say something before the example of attacks had started and I don't know. I do know that friends of mine, some former friends actually, who damn well knew what was being said was a lie and I asked for help and they said, "you know, I'm not going to because it will threaten my position with the university and I won't get grants from certain granting bodies."

Plenty of people just self-preservation, cowardice or, maybe as I say, maybe just pragmatists because I haven't gotten very far. My reward for trying to speak out has just been, well I'm pretty much extinguished from being a professional scientist.

***John Kirby:***

Well I've seen this happening again and again, we've seen in happening all over the world. We've seen it happening to eminent epidemiologists like Dr John Ioannidis, etc., etc., and of course the provisions you're talking about that the British Official Censors have put in have of course repeated throughout Social Media, YouTube, Twitter, etc. And we've experienced it ourselves on this channel. And I want to Thank you by the way for taking the risk that you've taken and I can tell you that it's much appreciated by many people all over the world and will continue to be. Let's hope it does some good. I want

to give you a sample from a recent British publication, they call it the "Summary Of Modeling Of Easing Road map."

Step 2: And this is a short excerpt that I think is very telling. It's buried in this document, it's on page 10, I don't know if you've seen it yet but this is going back to the vaccine. It says: "The resurgence in both hospitalizations and deaths is dominated by those who have received two doses of the vaccine comprising around 60% and 70% of the wave respectively. This can be attributed to the high levels of uptake in the most 'at risk' age groups such that immunization failures account for more serious illness than unvaccinated individuals. This is discussed further in paragraphs 55 and 56. What do you make of this? This seems to be an admission that people who have gotten their full compliment of vaccine are more at risk of the, I guess the wild virus or who knows what so immune dependent enhancement, antibody dependent enhancement, it's unclear what exactly they're saying but they're essentially it seems, admitting that if you've been vaccinated you're now at greater danger of dying.

### *Dr. Yeadon:*

Yeah, I didn't read it like that, just a few things. Remember these are models, they're models, please for G_ds sake people they're not chicken entrails, they don't have a time machine right, they're not predictions of the future. What they are is mathematical models and the problems with mathematical models—it's like a sausage factory—what you throw in one end and turn the handle and a product comes out so they're just telling you that they think if there's another wave the subjects that would fall ill would come from the groups that you just described. I don't think they're necessarily saying that will happen because if they are I would will ask them if I was in this room, "How would you know that?"

I don't know why they've produced that forecast, it just looks like nonsense but all of their models have been nonsense. It's very strange that they, I've never seen that modeling group go back and say this is what we said will happen, here's what happens, this is why you should have confidence in our forecast. Of course the reason they haven't done that is that none of the forecasts have been even faintly close to the answer. I'm afraid our world seems to be being destroyed by credulous people paying attention to mathematical modelers, you know, projections as to what will happen.

What I would say is, yeah, if the vaccine is affective and certainly the trial purport to show that and I'm not in a position to say that's not true although I know some people say it's not true, but if the vaccines are effective it's not possible to get what's called epidemic spreading. Even if there were 20% say who are vulnerable, they're vaccination failures. A percentage of people vaccinated don't become immune. That's true. But it would be very unlikely that they would acquire the virus because how could they as I just described ten minutes ago they would need to encounter a source of infectiousness and there's

very little of it and there's very few people who could be it. I don't even understand the assumption they've used in this most recent model could possibly produce that outcome.

### *John Kirby:*

Doctor let's talk about what we've been observing in the short term. I know one of the great concerns that we all share is what the long-term effects of this brand new experimental, some would call it a 'gene therapy' injection is. But we've been seeing and you and Dr. Bhakti have described short-term adverse reactions. What have we been seeing and how does that comport with some of the projections you all were making?

### *Dr. Yeadon:*

Yeah, certainly, so yes, I've been working with a number of scientists and physicians and we've called ourselves "Doctors For COVID Ethics," and we've written a number of times to the European Medicines Agency, that's the agency that regulates medical products. And we noticed just through the network, we were hearing that a number of people were suffering what we call thromboembolic disorder so this disorder's of blood clots and bleeding are ugly enough. And I was looking at some of the basic science and with horror I came across a number of papers that were written between 2000 and 2010 about the Spikes, the Spike Proteins on the earlier SARS virus 2003. And I realized to my horror that the Spike Protein is not a passive protein that the virus uses to anchor onto a sort of docking receptor on the outside of human cells which it uses then to enter the cell. It's not a passive protein at all it's biologically active, the Spike Protein is biologically active. It can be described as fusogeneic, that is it prompts cells that are contacted to stick together even including blood platelets as you probably will gather. Once blood platelets start sticking together that can be the initiation of a blood clot and furthermore those Spike Proteins are capable of initiating some of the steps of the blood coagulation pathway. So it is potentially a lethal combination. I didn't know it at the time, I came across this a couple of months ago but you would think the vaccine manufacturers should have done their homework and checked whether or not the piece of dead virus that they were having human cells manufacture through these gene based vaccines would not itself be harmful but it seems to me I can only assume they missed it.

But I think what these vaccines all do is they encourage your body to manufacture that Spike Protein or part of that Spike Protein and stick it on the outside of a cell or release it from those cells and so it struck me at the time that could be both an explanation for some of the thromboembolic disorders and furthermore you could expect that you would get some very serious cases and let me just explain why. By contrast with traditional vaccines where you would be given a defined dose of a dead pathogen, so you'd know how much you were getting, with these gene based vaccines you get a defined dose of it but depending on where it lands in your body, as it distributes, how efficiently it's taken up, how efficiently it's copied, how often, how well that genetic message is translated into the

Spike Protein, you could end up with quite different outcomes. And I believe some people were unfortunate, perhaps had a greater distribution of the vaccine and so perhaps certain vulnerable vessels in their brain, and perhaps in some of those people the vaccine was taken up well and copied efficiently and if you furthermore imagine some of those patients were perhaps in unstable position, they could easily be prompted to form a clot. That's all you need to hypothesize in order to explain the deaths in healthy young women age 20 to 50 with an extremely unusual Cerebral Vein Sinus Thrombosis. But I think those "side-effects" are occurring in other blood vessels that are moving rather cyclically slowly, certainly there are some in the abdomen and the so-called Splantchnik vein and any slow moving blood vessel if you're unlikely enough to have a disproportionately large dose and they're sufficiently taken up and sufficiently copied now you've got an amount of the Spike Protein that you really don't want in the inside of your blood vessels lurking there able to perhaps prompt the start of a serious adverse event. So it's my contention that all of the gene-based vaccines that were fundamentally like that, that they harness the bodies ability to manufacture the Spike protein or part of it. I think all of them should be thought of having, to an extent, a class risk.

I think we should regard all of them as having that risk. One of the things I've been both annoyed and furious and terrified all at the same time is this increasing push certainly by governments, the United Kingdom and I know in other places to push this vaccine down and down into the younger and younger population and yet we know from the work of Dr John Ioannidis and others that the strongest risk factor for becoming very ill and dying after being infected by this virus is age. So if you're younger than about 70 and you don't have any preexisting illnesses you're really very unlikely to die. In fact, less likely to die with this virus than Influenza. So why would anyone want to give it to someone who's under 50 who's well, under 40 who's well, under 30 who's well, and I'm afraid my government is hellbent on vaccinating everybody from the age of 18 and over and at the same time, I think it's briefly paused, but there is an ongoing pediatric study as well and of course why would they do that, because they want to vaccinate all the children as well and I put it to you, any listener, can you think of a benign explanation for why you would want to give an experimental use authorized gene based vaccine to millions, tens of millions of people who could not possibly die if they ran into this virus and the answer is no, you can't, can you?

So if you can't think of a benign explanation for what's happening, and remember it's not the only bad thing that's happening you have to start looking for malign explanations and I think I've come up with what it is and it's this damn vaccine passport. Now there's a lot of talk about vaccine passports and they're just nonsense. Let me just explain. If you're a vulnerable person and you've chosen to be vaccinated and all has gone well and in really most cases you are now protected. You do not need to know the immune status of anyone around you in a football game, or a theater or a shop. You wouldn't benefit from the pres-

ence of a vaccine passport in the hands of anyone around you because you're protected by your vaccination. If, on the other hand, you've chosen not to be vaccinated because you're young and healthy and you've looked at the statistics and you're not at risk from the virus you don't need to know anyone else's immune status either. You don't need to see their vaccine passport. So neither the vaccinated nor the unvaccinated benefit at all from vaccine passports.

I can tell you who will benefit. The people who are pushing it on you and guess what, if vaccine passports come into being there will be the worlds first common format digital ID for every person on the planet and at least one editable health related flag which will be—is your vaccine passport valid or not—and then whoever controls that database can set the algorithm to allow someone whose got a valid vaccine passport to cross a boundary like an international border or getting into a shop or sports game and it will prohibit people from that, from doing those things. It doesn't benefit any of the people but it definitely benefits the totalitarian controllers who have that database. It's never been like this in the world before and I believe if it goes live we'll not only be standing at the Gates Of Hell, we'll be just given a little push and in we all go. Because, once you're on the system your while life is permissioned by your status on the system, have you got a valid vaccine or not.

Then you can be made to do absolutely anything, so let me just imagine this situation in 6 months time your vaccine passport pings and there's a message there that says "Dr. Yeadon, it's time to come down for your top-up vaccine," which we'll talk about in a minute and there's another little ping and it says, "Please bring your ten-year-old grandchild because we've noticed they've not been vaccinated."

My final comment will be, I just need to let you know, If you don't comply with these two requirements within 3 weeks your vaccine passport will expire and you'll be excluded from your life and all parts of your life so you might think you wouldn't let your grandchild be vaccinated but I've just told you, I've shown you, if you let this damn thing go live you'll be coerced into doing it, you'll have no way out, you'll have to comply.

Why would you want to top up a vaccine. This is a thing that really catalyzed my recent series of interviews. I know as an immunologist, I would say that one of my strongest suits is immunology and I'm absolutely confident that all the stories they are telling you around the world about variants is a lie. It's complete fraud and I can exemplify.

So we're all being told about variants from Brazilian, the Kent, South African and so on, I just ask people to take a look, take a deep breathe recognize it's a big virus, it consists of what's called Amino Acids, 10,000 of then in strings and then all folded up to form the characteristic shape that you know and hate. If you go and look for the virus that is most

different from the one originally sequenced in Wuhan about 16 months ago you will find that the most different variant is only 0.3% different so it's 99.7% identical, they're all of them 99.7% identical to the original and you might be thinking that doesn't sound like enough to escape the human immune system and you're right, it's not, and I can prove it, that the 2003 SARS virus is related to SARS CoV-2, they differ by about 20%, two zero, so about 80 times as much variation between those two viruses and any of the variants of the current one. I can assure you that when immunology researchers found scores of people who had been infected by SARS in 2003, they took blood samples from these volunteers and [they] confirmed two important things.

One, all of the survivors still had really good immune to the virus they'd encountered 17 years ago, this is what you'd expect but what was wonderful is they all also possessed what's called cross immunity, their immune systems recognize the new virus. And I'm not surprised. The human immune system essentially takes multiple pictures of any pathogen that it encounters, often between 15 and 30 pictures and basically none of the variants change more than a couple of those pictures so when you encounter the variant having been immunized by infection or vaccination it's impossible, it's not just implausible, it's impossible that your body doesn't recognize that variant as something it's seen before.

So your governments are lying to you and in my case the United Kingdom has closed the border effectively, really restricted international travel and the reason they give is because of these variants. Which I know, for certain, there's a lie, they're not a problem at all. Furthermore, what's absolutely terrifying is two further bits of information I want your viewers and listeners to hear.

The pharmaceutical industry is already manufacturing so called "Top-Up" or variant vaccines. If I'm right and they're not, these variants aren't different enough to warrant a different vaccine, and they are not, what is it that they're manufacturing?

I don't know the answer to that question but I'm actually terrified.

And then I give you one last piece of information, a few weeks ago the worlds medicine regulators including the FDA, the European Medicines Agency and their sibling in Japan, and they issued a statement that said that the variants or Top-Up vaccines are so similar—so the parent vaccines from which they were derived, we will not require the drug companies to run any clinical trials or safety studies on them.

So yes, you've got that right. If a drug company designs a vaccine on a computer it'll go straight to manufacturing and as long as it meets manufacturing clauses and standards than it can be injected into the arms of hundreds of millions and billions of people.

And remember what I said about the vaccine passports. Once they're up and running, once it tells you to do something on pain of losing the validity of your vaccine passport, you will comply. Now if you wanted to be really terrified and since it's not my crime I don't know why they're manufacturing Top-Up vaccines and so I don't know what their intent is in injecting you.

But we don't need a particularly vivid imagination to think that so much of this crisis has been malign and there is no benign interpretation of what's going on. It certainly has the potential to be a very harmful event.

***John Kirby:***
What should people do when they're confronted with this pressure, enormous pressure all over the world. It's not obviously just in the UK or America, it's everywhere. There's enormous pressure to take this vaccine as you say, there's the looming passport, it's already been instituted in Israel, what should people do, what's the best response, how can we resist this.

***Dr. Yeadon:***
Honestly it's not any harder than it sounds actually, it's to say thank you very much for your generous offer of a free vaccine but for my own reasons I've decided to decline and do not engage in debate with them. You don't need to explain your position, you're a Sovereign human being and you decide what goes into your body or not. Say thanks very much but I'm declining. Do not engage them in discussions even if they insist. You're saying hey look, I've made my decision, Thank You very much.

And then the other thing that must be done is to prevent the vaccine passport system from coming into being. You're being told that it's necessary to regain confidence but I've just explained that if you're vaccinated you're protected and if you have chosen not to be vaccinated you don't need to know. So no one needs to know anybody else's immune status. There's no benign reason for it to come in. I think we could easily recover our confidence frankly by just being told the truth. That's what's needed, not some ghastly, nightmarish, totalitarian control system because I'm afraid that's what it'll be. I actually think that was always the objective.

So legislators who listening or people who know legislators, get on their case, explain to them, there are no advantages.

Don't let them fool you into,"Oh it'll only be a temporary measure," like income tax.

Once it starts there's no recovery from it and I've just explained, I given examples that if

you're asked to do anything at all for yourself or in relation to your children or grandchildren, if your told that if you don't comply we will henceforth turn off the validity of your vaccine passport, say you won't be able to go to the shops anymore, eventually you won't be able to buy gasoline, or leave your house.

Whatever the rules the controllers set
you will then be coerced into doing whatever they tell you.

Is that what you really wanted? If not you better start demonstrating because single individuals like me can do nothing. I can warn you and explain how much danger you're in but you behind the camera, you watching, if you don't do something these criminals are going to steal liberal democracy and freedom forever.

— End Full Video Transcript —

https://www.bitchute.com/video/cNa5JkmV27rj/

# CHAPTER TWO

## THE PEER REVIEW

1. Introducing Dr. John P.A. Ioannidis
2. COVID Autopsies • Both Vaccinated and Unvaccinated
3. Death By Vaccination

# John P.A. Ioannidis

PROFESSOR OF MEDICINE (STANFORD PREVENTION RESEARCH)
OF EPIDEMIOLOGY AND POPULATION HEALTH AND BY COURTESY
OF STATISTICS AND OF BIOMEDICAL DATA SCIENCE

Medicine - Stanford Prevention Research Center

Web page: http://web.stanford.edu/people/jioannid

My work aims to improve research methods and practices and to enhance approaches to integrating information and generating reliable evidence. Science is the best thing that can happen to humans, but doing research is like swimming in an ocean at night. Science thrives in darkness.

Born in New York City in 1965 and raised in Athens, Greece. Valedictorian (1984) at Athens College; National Award of the Greek Mathematical Society (1984); MD (top rank of medical school class) from the National University of Athens (1990); also received DSc in biopathology from the same institution. Trained at Harvard and Tufts (internal medicine, Infectious diseases), then held positions at NIH, Johns Hopkins and Tufts. Chaired the Department of Hygiene and Epidemiology, University of Ioannina Medical School in 1999-2010 while also holding adjunct professor positions at Harvard, Tufts, and Imperial College.

Moved to Stanford in 2010, initially as Director/C.F. Rehnborg Chair at Stanford Prevention Research Center, then diversified with appointments in 4 departments and membership in 8 centers/institutes at Stanford. Launched the PhD program in Epidemiology & Clinical Research and the MS program in Community Health & Prevention Research. Launched METRICS in 2014 and METRIC-B in 2019. Senior Advisor on Knowledge Integration at NCI/NIH (2012-6).

Served as President, Society for Research Synthesis Methodology, and editorial board member of many leading journals (including PLoS Medicine, Lancet, Annals of Internal Medicine, JNCI among others) and as Editor-in-Chief of the European Journal of Clinical Investigation (2010-2019). Delivered ~600 invited and honorary lectures. Recipient of

many awards (e.g. European Award for Excellence in Clinical Science [2007], Medal for Distinguished Service, Teachers College, Columbia U [2015], Chanchlani Global Health Award [2017], Epiphany Science Courage Award [2018], Einstein fellow [2018], Gordon award [2019]). Inducted in the Association of American Physicians (2009), European Academy of Cancer Sciences (2010) American Epidemiological Society (2015), European Academy of Sciences and Arts (2015), National Academy of Medicine (2018), Accademia delle Scienze (Bologna) (2021). Honorary titles from FORTH (2014) and Ioannina (2015), honorary doctorates from Rotterdam (2015), Athens (2017), Tilburg (2019), Edinburgh (2019, ceremony moved to 2021), Aristotle U Thessaloniki (2020, ceremony moved to 2021).

Multiple honorary lectureships/visiting professorships (Caltech, Oxford, LSHTM, Yale, U Utah, U Conn, UC Davis, U Penn, Wash U St. Louis, NIH among others). The PLoS Medicine paper on "Why most published research findings are false" has been the most-accessed article in the history of Public Library of Science (>3 million hits). Author of 8 literary books in Greek, three of which were shortlisted for best book of the year Anagnostis awards. Brave Thinker scientist for 2010 according to Atlantic, "may be one of the most influential scientists alive".

Highly Cited Researcher according to Thomson Reuters in both Clinical Medicine and in Social Sciences. Citation indices: h=213, m=9 per Google Scholar. Current citation rate: >6,000 new citations per month (among the 10 scientists worldwide who are currently the most commonly cited). When contrasted against my vast ignorance, these values offer excellent proof that citation metrics can be horribly unreliable.

I have no personal social media accounts - I admire people who can outpour their error-free wisdom in them, but I make a lot of errors, I need to revisit my writings multiple times before publishing, and I see no reason to make a fool of myself more frequently than it is sadly unavoidable. I consider myself privileged to have learned and to continue to learn from interactions with students and young scientists (of all ages) from all over the world and I love to be constantly reminded that I know next to nothing.

## Academic Appointments

Professor, Medicine - Stanford Prevention Research Center
Professor, Epidemiology and Population Health
Professor (By courtesy), Statistics
Professor (By courtesy), Biomedical Data Science
Member, Bio-X
Member, Cardiovascular Institute
Member, Stanford Cancer Institute
Affiliate, Stanford Woods Institute for the Environment

## Administrative Appointments

Co-Director, Meta-Research Innovation Center at Stanford (METRICS) (2013 - Present)
Editor-in-chief, European Journal of Clinical Investigation (2010 - 2019)
Member, Stanford Cardiovascular Institute (2010 - Present)
Member, Stanford Cancer Center (2010 - Present)
Affiliate, Stanford Center on Longevity (2012 - Present)
All Administrative Appointments (13)

## Honors & Awards

Albert Stuyvenberg Medal, European Society for Clinical Investigation (2021)
Elected corresponding member, Accademia delle Scienze (Bologna) (2021)
Haldane lecture, Wolfson College, Oxford University (2021)
J Arliss Pollock Award and Memorial Lecture, American Society of Neuroradiology (2021)
Morris/Paffenbarger Exercise is Medicine® Keynote Lecture, American College of Sports Medicine (2021)
All Honors & Awards (40)

## Boards, Advisory Committees, Professional Organizations

Chair, Scientific Advisory Board, Usher Institute for Population Health Sciences and Informatics, University of Edinburgh (2015 - Present)
Faculty Fellow, Stanford Center for Innovation on Global Health (2015 - Present)
Member, SAB, Berkeley Initiative for Transparency in Social Sciences (2014 - Present)
Member, Scientific Advisory Board, Center for Open Science (2013 - Present)
Member, Scientific Advisory Board, International Epidemiology Institute (2012 - Present)
Member, Scientific Advisory Board, Reproducibility Initiative (2012 - Present)
Senior Advisor for Knowledge Integration, NCI, NIH (2012 - 2016)
Member, Methodology Committee, PCORI (2011 - 2013)
Vice President, Board of Directors, Hellenic Center for Infectious Disease Control (2000 - 2001)

## Professional Education

Fellowship, New Eng. Med. Ctr, Tufts University School of Medicine, Infectious Diseases (1996)
Residency, New England Deaconess Hospital, Harvard Medical School, Internal Medicine (1993)
DSc, University of Athens School of Medicine, Athens, Greece, Biopathology (1996)
MD, University of Athens School of Medicine, Athens, Greece, Medicine (1990)

Essay

# Why Most Published Research Findings Are False

John P. A. Ioannidis


## Summary

There is increasing concern that most current published research findings are false. The probability that a research claim is true may depend on study power and bias, the number of other studies on the same question, and, importantly, the ratio of true to no relationships among the relationships probed in each scientific field. In this framework, a research finding is less likely to be true when the studies conducted in a field are smaller; when effect sizes are smaller; when there is a greater number and lesser preselection of tested relationships; where there is greater flexibility in designs, definitions, outcomes, and analytical modes; when there is greater financial and other interest and prejudice; and when more teams are involved in a scientific field in chase of statistical significance. Simulations show that for most study designs and settings, it is more likely for a research claim to be false than true. Moreover, for many current scientific fields, claimed research findings may often be simply accurate measures of the prevailing bias. In this essay, I discuss the implications of these problems for the conduct and interpretation of research.


Published research findings are sometimes refuted by subsequent evidence, with ensuing confusion and disappointment. Refutation and controversy is seen across the range of research designs, from clinical trials and traditional epidemiological studies [1–3] to the most modern molecular research [4,5]. There is increasing concern that in modern research, false findings may be the majority or even the vast majority of published research claims [6–8]. However, this should not be surprising. It can be proven that most claimed research findings are false. Here I will examine the key factors that influence this problem and some corollaries thereof.

The Essay section contains opinion pieces on topics of broad interest to a general medical audience.

## Modeling the Framework for False Positive Findings

Several methodologists have pointed out [9–11] that the high rate of nonreplication (lack of confirmation) of research discoveries is a consequence of the convenient, yet ill-founded strategy of claiming conclusive research findings solely on the basis of a single study assessed by formal statistical significance, typically for a *p*-value less than 0.05. Research is not most appropriately represented and summarized by *p*-values, but, unfortunately, there is a widespread notion that medical research articles should be interpreted based only on *p*-values. Research findings are defined here as any relationship reaching formal statistical significance, e.g., effective interventions, informative predictors, risk factors, or associations. "Negative" research is also very useful. "Negative" is actually a misnomer, and the misinterpretation is widespread. However, here we will target relationships that investigators claim exist, rather than null findings.

**It can be proven that most claimed research findings are false.**

As has been shown previously, the probability that a research finding is indeed true depends on the prior probability of it being true (before doing the study), the statistical power of the study, and the level of statistical significance [10,11]. Consider a 2 × 2 table in which research findings are compared against the gold standard of true relationships in a scientific field. In a research field both true and false hypotheses can be made about the presence of relationships. Let $R$ be the ratio of the number of "true relationships" to "no relationships" among those tested in the field. $R$ is characteristic of the field and can vary a lot depending on whether the field targets highly likely relationships or searches for only one or a few true relationships among thousands and millions of hypotheses that may be postulated. Let us also consider, for computational simplicity, circumscribed fields where either there is only one true relationship (among many that can be hypothesized) or the power is similar to find any of the several existing true relationships. The pre-study probability of a relationship being true is $R/(R + 1)$. The probability of a study finding a true relationship reflects the power $1 - \beta$ (one minus the Type II error rate). The probability of claiming a relationship when none truly exists reflects the Type I error rate, $\alpha$. Assuming that $c$ relationships are being probed in the field, the expected values of the 2 × 2 table are given in Table 1. After a research finding has been claimed based on achieving formal statistical significance, the post-study probability that it is true is the positive predictive value, PPV. The PPV is also the complementary probability of what Wacholder et al. have called the false positive report probability [10]. According to the 2 × 2 table, one gets $PPV = (1 - \beta)R/(R - \beta R + \alpha)$. A research finding is thus

**Citation:** Ioannidis JPA (2005) Why most published research findings are false. PLoS Med 2(8): e124.

**Copyright:** © 2005 John P. A. Ioannidis. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Abbreviation:** PPV, positive predictive value

John P. A. Ioannidis is in the Department of Hygiene and Epidemiology, University of Ioannina School of Medicine, Ioannina, Greece, and Institute for Clinical Research and Health Policy Studies, Department of Medicine, Tufts-New England Medical Center, Tufts University School of Medicine, Boston, Massachusetts, United States of America. E-mail: jioannidi@cc.uoi.gr

**Competing Interests:** The author has declared that no competing interests exist.

**DOI:** 10.1371/journal.pmed.0020124

PLoS Med. 2016 Jun; 13(6): e1002049.
Published online JUne 21st, 2016. doi: 10.1371/journal.pmed.1002049

# Why Most Clinical Research Is Not Useful

By John P. A. Ioannidis 1 , 2

1. Stanford Prevention Research Center
Department of Medicine and Department of Health Research and Policy
Stanford University School of Medicine, Palo Alto, California, United States of America
2. Meta-Research Innovation Center at Stanford (METRICS)
Stanford University, Palo Alto, California, United States of America
E-mail: ude.drofnats@dinnaoij

The author is a member of the editorial board of PLOS Medicine.

## Summary Points

Blue-sky research cannot be easily judged on the basis of practical impact, but clinical research is different and should be useful. It should make a difference for health and disease outcomes or should be undertaken with that as a realistic prospect.

Many of the features that make clinical research useful can be identified, including those relating to problem base, context placement, information gain, pragmatism, patient centeredness, value for money, feasibility, and transparency.

Many studies, even in the major general medical journals, do not satisfy these features, and very few studies satisfy most or all of them. Most clinical research therefore fails to be useful not because of its findings but because of its design.

The forces driving the production and dissemination of non-useful clinical research are largely identifiable and modifiable.

Reform is needed. Altering our approach could easily produce more clinical research that is useful, at the same or even at a massively reduced cost.

Practicing doctors and other health care professionals will be familiar with how little of what they find in medical journals is useful. The term "clinical research" is meant to cover all types of investigation that address questions on the treatment, prevention, diagnosis/screening, or prognosis of disease or enhancement and maintenance of health. Experi-

mental intervention studies (clinical trials) are the major design intended to answer such questions, but observational studies may also offer relevant evidence. "Useful clinical research" means that it can lead to a favorable change in decision making (when changes in benefits, harms, cost, and any other impact are considered) either by itself or when integrated with other studies and evidence in systematic reviews, meta-analyses, decision analyses, and guidelines.

There are many millions of papers of clinical research—approximately 1 million papers from clinical trials have been published to date, along with tens of thousands of systematic reviews—but most of them are not useful. Waste across medical research (clinical or other types) has been estimated as consuming 85% of the billions spent each year [1]. I have previously written about why most published research is false [2] and how to make more of it true [3]. In order to be useful, clinical research should be true, but this is not suf-

**Table 1**

**Features to consider in appraising whether clinical research is useful.**

| Feature | Questions to Ask |
|---|---|
| Problem base | Is there a health problem that is big/important enough to fix? |
| Context placement | Has prior evidence been systematically assessed to inform (the need for) new studies? |
| Information gain | Is the proposed study large and long enough to be sufficiently informative? |
| Pragmatism | Does the research reflect real life? If it deviates, does this matter? |
| Patient centeredness | Does the research reflect top patient priorities? |
| Value for money | Is the research worth the money? |
| Feasibility | Can this research be done? |
| Transparency | Are methods, data, and analyses verifiable and unbiased? |

ficient. Here I describe the key features of useful clinical research (Table 1) and the current state of affairs and suggest future prospects for improvement.

Making speculative, blue-sky research more productive represents a partly intractable problem, given the unpredictability of such research, but significantly improving clinical research—and developing tools for assessing its utility or lack thereof—appears conceptually more straightforward.

## Features of Clinically Useful Research

### Problem Base

There is higher utility in solving problems with higher disease burdens. However, context is important. Solving problems with low prevalence but grave consequences for affected patients is valuable, and broadly applicable useful research may stem from studying rare conditions if the knowledge is also relevant to common conditions (e.g., discovering the importance of the pro-protein convertase subtilisin-kexin type 9 [PCSK9] pathway in familial hypercholesterolemia may help develop treatments for many other patients with cardiovascular disease). Furthermore, for explosive epidemics (e.g., Ebola), one should also consider the potential burden if the epidemic gets out of control.

Conversely, clinical research confers actual dis-utility when disease mongering [4] creates a fictitious perception of disease burden among healthy people. In such circumstances, treated people, by definition, cannot benefit, because there is no real disease to treat.

Data show only weak or modest correlations between the amount of research done and the burden of various diseases [5,6]. Moreover, disease mongering affects multiple medical specialties [4,7,8].

## Context Placement and Information Gain

Useful clinical research procures a clinically relevant information gain [9]: it adds to what we already know. This means that, first, we need to be aware of what we already know so that new information can be placed in context [10]. Second, studies should be designed to provide sufficiently large amounts of evidence to ensure patients, clinicians, and decision makers can be confident about the magnitude and specifics of benefits and harms, and these studies should be judged based on clinical impact and their ability to change practice.

Ideally, studies that are launched should be clinically useful regardless of their eventual results. If the findings of a study are expected to be clinically useful only if a particular re-

sult is obtained, there may be a pressure to either obtain that result or interpret the data as if the desired result has been obtained.

Most new research is not preceded or accompanied by systematic reviews [10,11]. Interventions are often compared to placebos or normal care, despite effective interventions having previously been demonstrated. Sample-size calculations almost always see each trial in isolation, ignoring other studies. Across PubMed, the median sample size for published randomized trials in 2006 was 36 per arm [12].

Non-validated surrogate outcomes lacking clinical insight [13] and composite outcomes that combine outcomes of very different clinical portent [14] are often utilized so that authors can claim that clinical studies are well powered. The value of "negative" results is rarely discussed when clinical studies are being designed.

## Pragmatism

Research inferences should be applicable to real-life circumstances. When the context of clinical research studies deviates from typical real-life circumstances, the question critical readers should ask is, to what extent do these differences invalidate the main conclusions of the study? A common misconception is that a trial population should be fully representative of the general population of all patients (for treatment) or the entire community (for prevention) to be generalizable. Randomized trials depend on consent; thus, no trial is a perfect random sample of the general population. However, treatment effects may be similar in nonparticipants, and capturing real-life circumstances is possible, regardless of the representativeness of the study sample, by utilizing pragmatic study designs.

Pragmatism has long been advocated in clinical research [15], but it is rare. Only nine industry-funded pragmatic comparative drug effectiveness trials were published between 1996 and 2010 according to a systematic review of the literature [16], while thousands of efficacy trials have been published that explore optimization of testing circumstances.

Studying treatment effects under idealized clinical trial conditions is attractive, but questions then remain over the generalizability of the findings to real-life circumstances. Observational studies (performed in the thousands) are often precariously interpreted as able to answer questions about causal treatment effects [17]. The use of routinely collected data is typically touted as being more representative of real life, but this is often not true. Most of the widely used observational studies deal with peculiar populations (e.g., nurses, physicians, or workers) and/or peculiar circumstances (e.g., patients managed in specialized health care systems or covered by specific insurance or fitting criteria for inclusion in a registry). Eventually, observational studies often substantially overestimate treatment effects [18,19].

## Patient Centeredness

Useful research is patient centered [20]. It is done to benefit patients or to preserve health and enhance wellness, not for the needs of physicians, investigators, or sponsors. Useful clinical research should be aligned with patient priorities, the utilities patients assign to different problems and outcomes, and how acceptable they find interventions over the period for which they are indicated. Proposed surrogate outcomes used in research need to closely correlate with real patient-relevant outcomes for patients in the clinic.

There is currently a heightened interest in patient-centered research, as exemplified by the Patient-Centered Outcomes Research Institute (PCORI), which was launched in 2012 in the United States to foster research relevant to patient needs [21]. Similar activities are ongoing in the United Kingdom and elsewhere. However, patients are still rarely involved in setting research priorities, despite the frequent mismatch between patient priorities and research agenda. Patients and physicians are frequently bombarded with information that tries to convince them that surrogates or other unimportant outcomes are important—such short-cuts either have commercial benefits or facilitate fast publication and academic advancement.

## Value for Money

Good value for money is an important consideration, especially in an era of limited resources, and this can be assessed with formal modeling (value of information) [22]. Different studies may require very different levels of financial investment and may differ substantially in how much we can learn from them. However, the benefits of useful clinical research more than offset the cost of performing it [23].

Most methods for calculating value for money remain theoretical constructs. Practical applications of value-of-information methods are counted in single digit numbers [24,25]. Clinical research remains extremely expensive, even though an estimated 90% of the present cost of trials could be safely eliminated [26,27]. Reducing costs by streamlining research could do more than simply allow more research to take place. It could help make research better by reducing the pressure to cut corners, which leads to studies lacking sufficient power, precision, duration, and proper outcomes to convincingly change practice.

## Feasibility

Even if all other features are met, some studies may be very difficult or practically impossible to conduct. Feasibility of research can sometimes be difficult to predict up front, and there may be unwarranted optimism among investigators and funders.

Many clinical trials are terminated because of futility. Twenty-five percent of the trials approved by six research ethics committees between 2000 and 2003 in Canada, Germany, and Switzerland were discontinued [28], and the discontinuation rate was 43% for a cohort of surgical trials registered between 2008 and 2009 [29]. For other types of research, feasibility problems are less accurately known but probably even more common.

## Transparency (Trust)

Utility decreases when research is not transparent, when study data, protocols, and other processes are not available for verification or for further use by others. Trust is also eroded when major biases occur in the design, conduct, and reporting of research.

Only 61% of trials published in clinical journals in 2010 had been registered [30], and rates are much lower for non-regulated interventions [31] (e.g., 21% and 29% for trials published in psychological or behavioral [32] and physical therapy [33] journals, respectively). Only 55/200 (28%) of journals that publish clinical trials required trial registration as of 2012 [34]. Few full protocols are registered, analysis plans are almost never prespecified, and the full study data are rarely available [35]. Trust has been eroded whenever major subversion of the evidence has been uncovered by legal proceedings [36] or reanalysis [37] with different conclusions (e.g., as in the case of neuraminidase inhibitors for influenza) [38]. Biases in the design, analysis, reporting, and interpretation remain highly prevalent [39–41].

## Other Considerations

### Uncertainty

Some uncertainty may exist for each of the features of clinical research outlined above, even though it is less than the uncertainty inherent in blue-sky and preclinical investigation. Uncertainty also evolves over time, especially when research efforts take many years. Questions can lose their importance when circumstances change. In one of my first papers, a systematic review of zidovudine mono-therapy [42], the question was extremely relevant when we started work in 1993 and still important when the paper was accepted in late 1994. However, by the time the study was published in mid-1995, the question was of no value, as new highly effective regimens had emerged: clinical utility was demolished by technological advances.

## Other sources of evidence besides trials

Observational studies often add more confusion rather than filling the information deficits [18,19]. Meta-analyses, decision analyses, and guidelines cannot really salvage the

situation based on largely useless studies and may add their own problems and biases [43–45].

## Focusing on major journals

Some clinicians prefer to read only research published in major general medical journals (The New England Journal of Medicine, The Lancet, BMJ, JAMA, and PLOS Medicine). However, these journals cover a tiny minority of published clinical research. Out of the 730,447 articles labeled as "clinical trial" in PubMed as of May 26, 2016, only 18,231 were published in the major medical journals. Most of the articles that inform guidelines and clinical practice are published elsewhere.

Studies in major general medical journals may do better in terms of addressing important problems, but given their visibility, they can also propagate more disease mongering than less visible journals. Clinical trials published in major medical journals are larger on average (e.g., median sample size 3,116 and 3,104, respectively, for papers published in The Lancet and BMJ in September 2007 [46]). However, the small clinical trials published in major general journals actually have more exaggerated results, on average, than equally small studies published elsewhere [47]. The Lancet requires routinely systematic placement of the research in context for trials, and increasingly, major journals request full protocols for published trials. Pragmatism, patient centeredness, assessments of value for money, and transparency and protection from bias remain suboptimal for most clinical research published in major journals (Table 2, next page).

## Overall Picture

Ultimately, no utility feature is met by the majority of clinical research studies, perhaps with the exception of feasibility (Table 2). Studies that meet all utility features or almost all of them are extreme rarities, even in the most highly selective journals.

# Improving the Situation

The problem of non-useful research should not be seen as a blame game against a specific group (e.g., clinical researchers) but instead should be seen as an opportunity to improve. The challenges and the problems to solve involve not only researchers but also institutions, funding mechanisms, the industry, journals, and many other stakeholders, including patients and the public. Joint efforts by multiple stakeholders may yield solutions that are more likely to be more widely adopted and thus successful [3].

Table 2

**How often is each utility feature satisfied in studies published in major general medical journals and across all clinical research?***

| Feature | Studies Published in Major General Medical Journals | All Clinical Research |
|---|---|---|
| Problem base | Varies a lot | Minority |
| Context placement | Varies per journal (uncommon to almost always) | Uncommon |
| Information gain | Majority | Rare |
| Pragmatism | Rare | Rare |
| Patient centeredness | Rare/uncommon | Rare |
| Value for money | Unknown, rare assessments | Unknown, rare assessments |
| Feasibility | Almost always | Majority |
| Transparency | Rare/uncommon (data sharing)**, almost always (trial registration), uncommon (other study registration) | Rare/uncommon, except for trial registration (still only a minority) |

*Rare: satisfied in <1% of studies; uncommon: satisfied in 1%–20% of studies; minority: satisfied in 20%–50% of studies; majority: satisfied in 50%–80% of studies; very common: satisfied in 80%–99% of studies; almost always: satisfied in >99% of studies. For supporting evidence for these estimates, see references cited in the text.

**The situation is improving in recent years for clinical trials.

## Clinical Research Workforce and Physicians

The clinical research workforce is huge: millions of people have coauthored at least one biomedical paper, and most have done so only once [48]. Students, residents, and clinical fellows are often expected to do some research. This exposure can be interesting, but trainees are judged on their ability to rapidly produce publications, a criterion that lends itself badly to the production of the sort of large, long-term, team-performed studies often needed to inform us about health, disease, and health care. Such researchers can become exploited as low-paid or volunteer personnel [49], and an untrained, non-committed workforce cannot produce high-quality research. Other perverse recipes in clinical research include universities and other institutions simply asking for more papers (e.g., least publishable units) instead of clinically useful papers and clinical impact not being a formal part of the publication metrics so often used to judge academic performance.

Instead of trying to make a prolific researcher of every physician, training physicians in understanding research methods and evidence-based medicine may also help improve

the situation by instilling healthy skepticism and critical thinking skills.

## The Industry–Regulator Dipole and Academic Partners

The industry and regulators are a closely connected dipole in licensing drugs and other products. Industry responds to regulatory requirements, and regulatory agencies increasingly act as both guardians of the common good and industry facilitators. This creates tension and ambiguity in mission. Industry should be enabled to better champion useful clinical research, with regulators matching commercial rewards to clinical utility for industry products, thus helping good companies outperform bad ones and aligning the interests of shareholders with those of patients and the public. Regulatory agencies may need to assume a more energetic role towards ensuring the conduct of large, clinically useful mega-trials.

Current research funding incentivizes small studies of short duration that can be quickly performed and generate rapidly publishable results, while answering important questions may sometimes require long-term studies whose financial needs exceed the resources of most currently available funding cycles. Partnerships with patient-centered research initiatives [50] and academia can potentially solve some of the challenges of designing and implementing more pragmatic trials [51].

One should acknowledge that even for streamlined randomized trials, the cost may be substantial if multiple such trials require support by public funds. The industry may still participate by contributing funds towards a common pool of resources under public control for trials conducted by non-conflicted academic investigators. One to two percent of the sales of blockbuster drugs diverted in such a pool [52] could earmark ample funding.

## Funding Agenda for Blue-Sky, Preclinical, and Clinical Science

Discovery research without prespecified deliverables—blue-sky science—is important and requires public support. However, a lot of "basic" investigation does have anticipated deliverables, like research into developing new drug targets or new tests. This research may best be funded by industry and those standing to profit if they deliver a product that is effective. Much current public funding could move from such preclinical research to useful clinical research, especially in the many cases in which a lack of patent protection means there is no commercial reason for industry to fund studies that might nevertheless be useful in improving care. Reallocation of funds could help improve all research (basic, preclinical, and clinical) (Table 3, above).

Table 3

**Funding of different types of research: Prespecified deliverables, utility, current funders, and ideal funders.**

| Type of Research | Prespecified Deliverables | Utility | Current Major Funder | Ideal Major Funder |
|---|---|---|---|---|
| Discovery "blue sky" science | No (high uncertainty by default) | Possible, but in entirely unpredictable ways, maybe decades later; very high failure rate per single idea/project explored | Public (e.g., NIH) | Public (e.g. NIH) |
| Applied preclinical research | Yes (uncertainty is substantial, but goals should be set) | Possible; substantial failure rate in single projects, but eventually the accumulated efforts should pay off | Public (e.g., NIH) | Entrepreneurs and industry who will profit if they deliver something that truly works; current public funding in this area should shift to clinical research instead |
| Clinical research | Yes (uncertainty is usually manageable, explicit goals should be set) | Yes; results should be sufficiently useful regardless of whether they are "positive" or "negative" (even if some particular results end up being more useful than others) | Industry | Public (e.g., NIH, PCORI); industry may contribute some funds to a common funding pool; regulatory agencies and universities/research institutions should safeguard the independence of research and may steer overall agenda |

NIH, National Institutes of Health; PCORI, Patient-Centered Outcomes Research Institute

## Journals

Journals can be very influential is setting standards of acceptable research. External groups could also appraise the clinical utility of the papers published in journals. For example, one could track a "Journal Clinical Usefulness Factor" scoring some features mentioned above.

## Patients and Related Advocacy Groups

Patients and related advocacy groups stand to gain most by an increase in clinically useful research. These groups can influence positively the utility of research when they are savvy about science-in-the-making and protected from biased influences. Public media and related commentators of health news [53] may also help by focusing on the need to obtain clinically useful research and not compromise for less.

## Conclusion

Overall, not only are most research findings false, but, furthermore, most of the true findings are not useful. Medical interventions should and can result in huge human benefit. It

makes no sense to perform clinical research without ensuring clinical utility. Reform and improvement are overdue.

Funding Statement

The Meta-Research Innovation Center at Stanford (METRICS) is funded by a grant from the Laura and John Arnold Foundation (http://www.arnoldfoundation.org). The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

References

1. Macleod MR, Michie S, Roberts I, Dirnagl U, Chalmers I, et al. Biomedical research: increasing value, reducing waste. Lancet. 2014;383(9912):101–4. 10.1016/S0140-6736(13)62329-6 [PubMed] [CrossRef] [Google Scholar]
2. Ioannidis JP. Why most published research findings are false. PLoS Med. 2005;2(8):e124 [PMC free article] [PubMed] [Google Scholar]
3. Ioannidis JP. How to make more published research true. PLoS Med. 2014;11(10):e1001747 10.1371/journal.pmed.1001747 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
4. Moynihan R, Doran E, Henry D. Disease mongering is now part of the global health debate. PLoS Med. 2008;5(5):e106 10.1371/journal.pmed.0050106 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
5. Evans JA, Shim JM, Ioannidis JP. Attention to local health burden and the global disparity of health research. PLoS ONE. 2014;9(4):e90147 10.1371/journal.pone.0090147 eCollection 2014. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
6. Viergever RF, Terry RF, Karam G. Use of data from registered clinical trials to identify gaps in health research and development. Bull World Health Organ. 2013;91(6):416–425C. 10.2471/BLT.12.114454 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
7. Moynihan R, Heath I, Henry D. Selling sickness: the pharmaceutical industry and disease mongering. BMJ 2002;324(7342):886–91. [PMC free article] [PubMed] [Google Scholar]
8. Frances A. Saving normal: an insider's revolt against out-of-control psychiatric diagnosis, DSM-5, big pharma, and the medicalization of ordinary life HarperCollins, New York, 2013. [Google Scholar]
9. Evangelou E, Siontis KC, Pfeiffer T, Ioannidis JP. Perceived information gain from randomized trials correlates with publication in high-impact factor journals. J Clin Epidemiol. 2012; 65(12):1274–81. 10.1016/j.jclinepi.2012.06.009 [PubMed] [CrossRef] [Google Scholar]
10. Clarke M, Chalmers I. Discussion sections in reports of controlled trials published in general medical journals: islands in search of continents? JAMA. 1998;280(3):280–2. [PubMed] [Google Scholar]
11. Clarke M1, Hopewell S, Chalmers I. Reports of clinical trials should begin and end with up-to-date systematic reviews of other relevant evidence: a status report. J R Soc Med. 2007;100(4):187–90. [PMC free article] [PubMed] [Google Scholar]
12. Hopewell S, Dutton S, Yu LM, Chan AW, Altman DG. The quality of reports of randomised trials in 2000 and 2006: comparative study of articles indexed in PubMed. BMJ. 2010;340:c723 10.1136/bmj.c723 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
13. Fleming TR, DeMets DL. Surrogate end points in clinical trials: are we being misled? Ann Intern Med. 1996;125(7):605–13. [PubMed] [Google Scholar]

14. Ferreira-González I, Busse JW, Heels-Ansdell D, Montori VM, Akl EA, et al. Problems with use of composite end points in cardiovascular trials: systematic review of randomised controlled trials. BMJ. 2007;334(7597):786 [PMC free article] [PubMed] [Google Scholar]
15. Tunis SR, Stryer DB, Clancy CM. Practical clinical trials: increasing the value of clinical research for decision making in clinical and health policy. JAMA. 2003;290(12):1624–32. [PubMed] [Google Scholar]
16. Buesching DP, Luce BR, Berger ML. The role of private industry in pragmatic comparative effectiveness trials. J Comp Eff Res. 2012;1(2):147–56. 10.2217/cer.12.9 [PubMed] [CrossRef] [Google Scholar]
17. Prasad V, Jorgenson J, Ioannidis JP, Cifu A. Observational studies often make clinical practice recommendations: an empirical evaluation of authors' attitudes. J Clin Epidemiol. 2013;66(4):361–366.e4. 10.1016/j.jclinepi.2012.11.005 [PubMed] [CrossRef] [Google Scholar]
18. Hemkens LG, Contopoulos-Ioannidis DG, Ioannidis JP. Routinely collected data and comparative effectiveness evidence: promises and limitations. CMAJ. 2016. May 17;188(8):E158–64. 10.1503/cmaj.150653 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
19. Hemkens LG, Contopoulos-Ioannidis DG, Ioannidis JP. Agreement of treatment effects for mortality from routinely collected data and subsequent randomized trials: meta-epidemiological survey. BMJ. 2016;352:i493 10.1136/bmj.i493 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
20. Mullins CD, Vandigo J, Zheng Z, Wicks P. Patient-centeredness in the design of clinical trials. Value Health. 2014;17(4):471–5. 10.1016/j.jval.2014.02.012 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
21. Selby JV, Lipstein SH. PCORI at 3 years–progress, lessons, and plans. N Engl J Med. 2014;370(7):592–5. 10.1056/NEJMp1313061 [PubMed] [CrossRef] [Google Scholar]
22. Meltzer DO, Hoomans T, Chung JW, Basu A. Minimal modeling approaches to value of information analysis for health research. Med Decis Making. 2011;31(6):E1–E22. 10.1177/0272989X11412975 [PubMed] [CrossRef] [Google Scholar]
23. Detsky AS. Are clinical trials a cost-effective investment? JAMA 1989;262(13);1795–1800. [PubMed] [Google Scholar]
24. Soares MO, Welton NJ, Harrison DA, Peura P, Shankar- Hari M, et al. An evaluation of the feasibility, cost and value of information of a multicentre randomised controlled trial of intravenous immunoglobulin for sepsis (severe sepsis and septic shock): incorporating a systematic review, meta-analysis and value of information analysis. Health Technol Assess. 2012;16(7):1–186. 10.3310/hta16070 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
25. Reith C, Landray M, Devereaux PJ, Bosch J, Granger CB, et al. Randomized clinical trials—removing unnecessary obstacles. N Engl J Med. 2013;369(11):1061–5. 10.1056/NEJMsb1300760 [PubMed] [CrossRef] [Google Scholar]
26. Minelli C, Baio G. Value of information: a tool to improve research prioritization and reduce waste. PLoS Med. 2015;12(9):e1001882 10.1371/journal.pmed.1001882 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
27. Eisenstein EL, Collins R, Cracknell BS, Podesta O, Reid ED, et al. Sensible approaches for reducing clinical trial costs. Clin Trials. 2008;5(1):75–84. 10.1177/1740774507087551 [PubMed] [CrossRef] [Google Scholar]
28. Kasenda B, von Elm E, You J, Blümle A, Tomonaga Y, et al. Prevalence, characteristics, and publication of discontinued randomized trials. JAMA. 2014;311(10):1045–51. 10.1001/jama.2014.1361 [PubMed] [CrossRef] [Google Scholar]
29. Chapman SJ, Shelton B, Mahmood H, Fitzgerald JE, Harrison EM, et al. Discontinuation and non-publication of surgical randomised controlled trials: observational study. BMJ.

2014;349:g6870 10.1136/bmj.g6870 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
30. Van de Wetering FT, Scholten RJ, Haring T, Clarke M, Hooft L. Trial registration numbers are underreported in biomedical publications. PLoS ONE. 2012;7:e49599 10.1371/journal.pone.0049599 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
31. Dal-Ré R, Bracken MB, Ioannidis JP. Call to improve transparency of trials of non-regulated interventions. BMJ. 2015;350:h1323 10.1136/bmj.h1323 [PubMed] [CrossRef] [Google Scholar]
32. Milette K, Roseman M, Thombs BD. Transparency of outcome reporting and trial registration of randomized controlled trials in top psychosomatic and behavioral health journals: a systematic review. J Psychosom Res. 2011;70:205–17. 10.1016/j.jpsychores.2010.09.015 [PubMed] [CrossRef] [Google Scholar]
33. Babu AS, Veluswamy SK, Rao PT, Maiya AG. Clinical trial registration in physical therapy journals: a cross-sectional study. Phys Ther. 2014;94:83–90. 10.2522/ptj.20120531 [PubMed] [CrossRef] [Google Scholar]
34. Wager E, Williams P, for the OPEN Project. "Hardly worth the effort"? Medical journals' policies and their editors' and publishers' views on trial registration and publication bias: quantitative and qualitative study. BMJ 2013;347:f5248 10.1136/bmj.f5248 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
35. Doshi P, Goodman SN, Ioannidis JP. Raw data from clinical trials: within reach? Trends Pharmacol Sci. 2013. December;34(12):645–7. 10.1016/j.tips.2013.10.006 [PubMed] [CrossRef] [Google Scholar]
36. Vedula SS, Bero L, Scherer RW, Dickersin K. Outcome reporting in industry-sponsored trials of gabapentin for off-label use. N Engl J Med. 2009;361(20):1963–71. 10.1056/NEJMsa0906126 [PubMed] [CrossRef] [Google Scholar]
37. Jefferson T, Doshi P. Multisystem failure: the story of anti-influenza drugs. BMJ. 2014;348:g2263 10.1136/bmj.g2263 [PubMed] [CrossRef] [Google Scholar]
38. Abramson JD, Rosenberg HG, Jewell N, Wright JM. Should people at low risk of cardiovascular disease take a statin? BMJ. 2013;347:f6123 Erratum in: BMJ. 2014;348:g3329. 10.1136/bmj.f6123 [PubMed] [CrossRef] [Google Scholar]
39. Ioannidis JP, Greenland S, Hlatky MA, Khoury MJ, Macleod MR, et al. Increasing value and reducing waste in research design, conduct, and analysis. Lancet. 2014;383(9912):166–75. 10.1016/S0140-6736(13)62227-8 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
40. Glasziou P, Altman DG, Bossuyt P, Boutron I, Clarke M, et al. Reducing waste from incomplete or unusable reports of biomedical research. Lancet. 2014;383(9913):267–76. 10.1016/S0140-6736(13)62228-X [PubMed] [CrossRef] [Google Scholar]
41. Chan AW, Song F, Vickers A, Jefferson T, Dickersin K, et al. Increasing value and reducing waste: addressing inaccessible research. Lancet. 2014;383(9913):257–66. 10.1016/S0140-6736(13)62296-5 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
42. Ioannidis JP, Cappelleri JC, Lau J, Skolnik PR, Melville B, et al. Early or deferred zidovudine therapy in HIV-infected patients without an AIDS-defining illness. Ann Intern Med. 1995;122(11):856–66. [PubMed] [Google Scholar]
43. Jørgensen AW, Hilden J, Gøtzsche PC. Cochrane reviews compared with industry supported meta-analyses and other meta-analyses of the same drugs: systematic review. BMJ. 2006;333(7572):782 [PMC free article] [PubMed] [Google Scholar]
44. Bell CM, Urbach DR, Ray JG, Bayoumi A, Rosen AB, Greenberg D, Neumann PJ. Bias in published cost effectiveness studies: systematic review. BMJ. 2006;332(7543):699–703. [PMC free article] [PubMed] [Google Scholar]
45. Lenzer J, Hoffman JR, Furberg CD, Ioannidis JP; Guideline Panel Review Working Group.

Ensuring the integrity of clinical practice guidelines: a tool for protecting patients. BMJ. 2013;347:f5535 10.1136/bmj.f5535 [PubMed] [CrossRef] [Google Scholar]
46. Altman DG. ISIS and the emergence of large, simple trials. Lancet. 2015;386 (9994):636–7. 10.1016/S0140-6736(15)61450-7 [PubMed] [CrossRef] [Google Scholar]
47. Siontis KC, Evangelou E, Ioannidis JP. Magnitude of effects in clinical trials published in high-impact general medical journals. Int J Epidemiol. 2011;40(5):1280–91. 10.1093/ije/dyr095 [PubMed] [CrossRef] [Google Scholar]
48. Ioannidis JP, Boyack KW, Klavans R. Estimates of the continuously publishing core in the scientific workforce. PLoS ONE. 2014;9(7):e101698 10.1371/journal.pone.0101698 eCollection 2014. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
49. Emanuel EJ. Reinventing American health care PublicAffairs, New York, 2014. [Google Scholar]
50. Fleurence RL, Curtis LH, Califf RM, Platt R, Selby JV, et al. Launching PCORnet, a national patient-centered clinical research network. J Am Med Inform Assoc. 2014;21(4):578–82. 10.1136/amiajnl-2014-002747 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
51. Sugarman J, Califf RM. Ethics and regulatory complexities for pragmatic clinical trials. JAMA. 2014;311(23):2381–2. 10.1001/jama.2014.4164 [PubMed] [CrossRef] [Google Scholar]
52. Ioannidis JP. Mega-trials for blockbusters. JAMA. 2013;309(3):239–40. 10.1001/jama.2012.168095 [PubMed] [CrossRef] [Google Scholar]
53. Schwitzer G. A guide to reading health care news stories. JAMA Intern Med. 2014;174(7):1183–6. 10.1001/jamainternmed.2014.1359 [PubMed] [CrossRef] [Google Scholar]

International Journal of Infectious Diseases 107 (2021) 172–175
April 14th, 2021

# First case of postmortem study in a patient vaccinated against SARS-CoV-2

By Torsten Hansena,*, Ulf Titzea, Nidhi Su Ann Kulamadayil-Heidenreichb, Sabine Glombitzac, Johannes Josef Tebbeb, Christoph Röckend, Birte Schulza, Michael Weiseb and Ludwig Wilkensc

a. Institute of Pathology, University Hospital OWL of the University of Bielefeld Campus Lippe, Detmold, Germany
b. Department of Internal Medicine, Gastroenterology and Infectious Medicine University Hospital OWL of the University of Bielefeld, Campus Lippe, Detmold, Germany
c. Institute of Pathology, KRH Hospital Nordstadt, Hannover, Germany
d. Institute of Pathology of the University of Schleswig-Holstein, Campus Kiel, Germany

## ABSTRACT

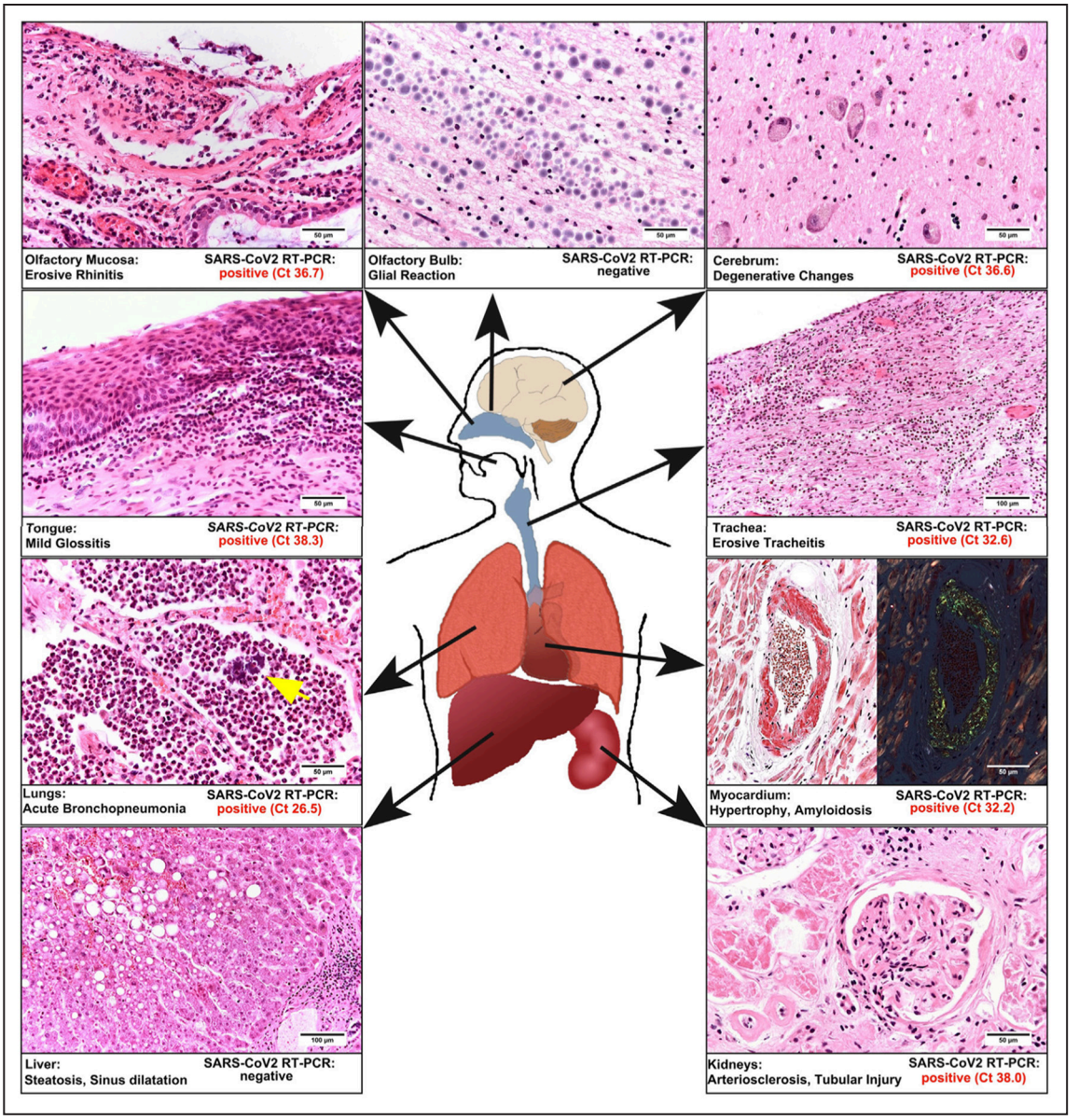
A previously symptomless 86-year-old man received the first dose of the BNT162b2 mRNA

COVID-19 vaccine. He died 4 weeks later from acute renal and respiratory failure. Although he did not present with any COVID-19-specific symptoms, he tested positive for SARS-CoV-2 before he died. Spike protein (S1) antigen-binding showed significant levels for immunoglobulin (Ig) G, while nucleocapsid IgG/IgM was not elicited. Acute bronchopneumonia and tubular failure were assigned as the cause of death at autopsy; however, we did not observe any characteristic morphological features of COVID-19. Postmortem molecular mapping by real-time polymerase chain reaction revealed relevant SARS-CoV-2 cycle threshold values in all organs examined (oropharynx, olfactory mucosa, trachea, lungs, heart, kidney and cerebrum) except for the liver and olfactory bulb. These results might suggest that the first vaccination induces immunogenicity but not sterile immunity.

## REPORT

We report on an 86-year-old male resident of a retirement home who received vaccine against SARS-CoV-2. Past medical history included systemic arterial hypertension, chronic venous insufficiency, dementia and prostate carcinoma. On January 9, 2021, the man received lipid nanoparticle-formulated, nucleoside-modified RNA vaccine BNT162b2 in a 30 mg dose. On that day and in the following 2 weeks, he presented with no clinical symptoms (Table 1). On day 18, he was admitted to hospital for worsening diarrhea. Since he did not present with any clinical signs of COVID- 19, isolation in a specific setting did not occur. Laboratory testing revealed hypochromic anemia and increased creatinine serum levels. Antigen test and polymerase chain reaction (PCR) for SARS- CoV-2 were negative.
Gastroscopy and colonoscopy were performed to investigate the cause of diarrhea further. Colonoscopy, in particular, demonstrated an ulcerative lesion of the left colonic flexure, which was histologically diagnosed as ischemic colitis. PCR-analysis on biopsy specimens, following a previously reported method (Kaltschmidt et al., 2021), was negative for SARS-CoV-2. Treatment was supportive with mesalazine and intravenous iron substitution. Subsequently, the patient's condition deteriorated under the development of renal insufficiency. On day 24, a patient in the same hospital room as our case tested positive for SARS-CoV-2. On day 25, our patient tested SARS-CoV-2 positive by real-time PCR (RT-PCR), with a low cycle threshold (Ct) value indicating high virus load. On further analysis of the swab sample, there was no evidence for mutant SARS-CoV-2 variants B.1.1.7, B.1.351 or B.1.1.28.1. Taken together, it appears the patient became infected from the patient in his hospital room. Our patient now presented with fever and respiratory discomfort, and lung auscultation displayed crackles. Despite starting supplemental oxygen (2 l per minute) and antibiotic therapy by ceftriaxone, the patient died from acute renal and respiratory failure on the following day.

Immunogenicity assessment by measuring spike protein (S1) antigen-binding immunoglobulin (Ig) G in the serum samples obtained at day 25 showed antibody response (8.7 U/ml, reference value <0.8–1.2 U/ml; Roche ECLIATM), while (nucleocapsid) NCP-IgG/




Synopsis of the relevant histological findings and the results of molecular mapping is presented. The histomorphology is obtained by standard hematoxylin and eosin reaction, except for the myocardium on the right side (Congo red staining). The magnification is shown by bars. Note that in the lungs, we also observed colonies of cocci (arrow) in granulocytic areas. In addition, the results of molecular mapping are given as evaluated cycle threshold values of the real-time polymerase chain reaction for SARS- CoV-2. Note that only in the olfactory bulb and the liver SARS-CoV-2 could not be detected.

IgM was not elicited (<0.1 U/ml, reference value >1.0 U/ml; Roche ECLIATM). These results indicate that the patient had already developed relevant immunogenicity through vaccination.

Postmortem study revealed acute bilateral bronchopneumonia with abscesses, sometimes being surrounded by bacterial cocci (Figure 1). There were no findings of commonly described manifestations of COVID-19-associated pneumonitis. In the heart, we found biventricular hypertrophy (weight 580 g) and histologically, we diagnosed ischemic cardiomyopathy. We detected amyloidosis of the transthyretin type in the heart and to a lesser extent in the lungs. The kidneys revealed both chronic damage with arteriolosclerosis and interstitial fibrosis, and acute renal failure with hydropic tubular degeneration. The examination of the brain revealed a left parietal pseudocystic tissue necrosis, which was diagnosed as an old infarction area.

We conducted molecular mapping of 9 different anatomical parts of formalin-fixed paraffin-embedded tissue as previously described (Kaltschmidt et al., 2021). RNA was extracted from paraffin sections using the Maxwell RSC (Promega, Madison, WI, USA). Multiplex RT-PCR analysis targeted 2 independent genes of the SARS-CoV-2-genome (Fluorotype SARS-CoV-2 plus Kit; HAIN/ Bruker, Nehren, Germany): RNA-dependent RNA polymerase (Target 1) and nucleopeptide (Target 2). The negative cut-off value was Ct >45. We examined 9 different tissue samples for known and relevant pathways of virus spreading in the human body (Figure 1). To prevent cross-contamination, each specimen was directly embedded in separate tissue cassettes and separately fixed in 4% phosphate-buffered saline-buffered formalin. We demonstrated viral RNA in nearly all organs examined except for the liver and the olfactory bulb (Figure 1, next page).

A detailed autopsy study including molecular virus map- ping of a patient vaccinated against SARS-CoV-2 with a positive SARS-CoV-2 test post-vaccination has not previously been reported, to the authors' knowledge. We suggest that a single treatment with BNT162b2 RNA vaccine elicited significant immunogenicity, as reflected in the reported spike protein- based neutralizing IgG serum values. From the weeks before vaccination, through vaccination (day 1), to shortly before death (day 24), the patient was free of any clinical symptoms typically ascribed to COVID-19. Furthermore, blood work did not show an IgM titer that is generally observed 7–14 days after symptom onset (Kim et al., 2020). However, the patient tested SARS-CoV-2 positive. Both the Ct value measured in nasopharyngeal swab and values measured in formalin-fixed paraffin- embedded autopsy specimens indicate viral load and suggest transmissibility. Because our patient died approximately 2 days after his first positive SARS-CoV-2 test result, we suppose that the molecular mapping data reflects an early stage of viral infection. An early stage of infection might also explain why different regions such as the olfactory bulb and liver were not (yet) affected by systemic viral spread. We did not observe any characteristic morpho-

logical features of COVID-19 reported in comprehensive morphological autopsy studies so far (Schaller et al., 2020; Edler et al., 2020; Ackermann et al., 2020). We did not find any typical signs of diffuse alveolar damage in the lungs, but we identified extensive acute bronchopneumonia, possibly of bacterial origin. We concluded that the patient died from bronchopneumonia and acute renal failure.

Our findings are in line with previous evidence from animal models that immunization against SARS-CoV-2 by vaccination appeared to reduce the severity of pathogenesis, especially with regard to severe lung disease, while viral RNA persisted in nasal swabs (Van Doremalen et al., 2020; Vogel et al., 2021). Recently, Amit et al. (2021) published results on a clinical trial on healthcare workers using vaccine BNT162b2 that demonstrated substantial early reductions in SARS-CoV-2 infection and symptomatic COVID-19 rates following administration of the first vaccine dose.

Concerning major adverse effects in patients receiving vaccination against SARS-CoV-2, local effects predominate, and severe systemic reactions are rarely described (Yuan et al., 2020). However, recent reports of an increased risk of blood clots, particularly of cerebral venous sinus thrombosis in the case of the Oxford-AstraZeneca vaccine (Mahase 2021), raised a matter of debate on the safety of COVID-19 vaccine in general. Comprehensive analysis of autopsy data must be performed to provide more detailed insights into lethal adverse effects and any deaths associated with vaccination.

In summary, the results of our autopsy case study in a patient with mRNA vaccine confirm the view that by first dose of vaccination against SARS-CoV-2 immunogenicity can already be induced, while sterile immunity is not adequately developed.

## Conflicts of interest

The authors do not have any commercial or financial conflict of interest.

## Ethical approval

This case study was performed in the setting of the German national "Defeat Pandemics" project, approved by the Medical Association of Westphalia-Lippe, Münster, Germany (Ref. 2020- 575-b-S) and carried out in accordance with the ethical principles of the Helsinki Declaration. Informed consent by the next-of-kin was available.

## Funding source

There was no funding received from any individual or organization.

## Acknowledgments

We are grateful for the expert technical assistance of Ralf Bode and Nadine Weber (University Hospital of OWL of the University of Bielefeld, Campus Lippe, Detmold).

## References

1. Ackermann M, Verleden SE, Kuehnel M, Haverich A, Welte T, Laenger F, et al. Pulmonary vascular endothelialitis, thrombosis, and angiogenesis in Covid-19. N Engl J Med 2020;383:120–8, doi:http://dx.doi.org/10.1056/NEJMoa2015432.
2. Amit S, Regev-Yochay G, Afek A, Kreiss Y, Leshem E. Early rate reductions of SARS- CoV2-infection and COVID-19 in BNT162b2 vaccine recipients. Lancet 2021;397 (10277):875–7, doi:
http://dx.doi.org/10.1016/S0140-6736(21)00448-7.
3. Edler C, Schröder AS, Aepfelbacher M, Fitzek A, Heinemann A, Heinrich F, et al. Dying with SARS-CoV2 infection – an autopsy study of the first consecutive 80 cases in Hamburg, Germany. Int J Legal Med 2020;134:1275–84, doi:http://dx.doi.org/ 10.1007/s00414-020-02336-7.
4. Kaltschmidt B, Fitzek ADE, Schaedler J, Förster C, Kaltschmidt C, Hansen T, et al. Hepatic vasculopathy and regernative responses of the liver in fatal cases of COVID-19. Clin Gastroenterol Hepatol 2021;, doi:http://dx.doi.org/10.1016/j.cgh.2021.01.044 In press.
5. Kim DS, Rowland-Jones S, Gea-Mallorqui E. Will SARS-CoV-2 infecion elicit long-lasting protective or sterilizing immunity? Implications for vaccine strategies. Front Immunol 2020;11:571481, doi:http://dx.doi.org/10.3389/fimmu.2020.571481.eCollection2020.
6. Mahase E. Covid-19: AstraZeneca vaccine is not linked to increased risk of blood clots, finds European Medicine Agency. BMJ 2021;372:n774, doi:http://dx.doi.org/10.1136/bmj.n774.
7. Schaller T, Hirschbühl K, Burkhardt K, Braun G, Trepel M, Märkl B, et al. Postmortem examinations of patients with COVID19. JAMA 2020;323:2518–20, doi:
http://dx.doi.org/10.1001/jama.2020.8907.
8. Van Doremalen N, Lambe T, Spencer A, Belij-Rammersdorfer S, Purushotham JN, Port JR, et al. ChAdOx1 nCoV-19 vaccine prevents SARS-CoV-2 pneumonia in rhesus macaques. Nature 2020;586:578–82, doi:http://dx.doi.org/10.1101/ 2020.05.13.093195.
9. Vogel AB, Kanevsky I, Che Y, Swanson KA, Muik A, Vormehr M, et al. Immunogenic BNT162b vaccines protect rhesus macaques from SARS-CoV-2. Nature 2021;592 (7853):283–9, doi:
http://dx.doi.org/10.1101/2020.12.11.421008.
10. Yuan P, Ai P, Liu Y, Ai Z, Wang Y, Cao W, et al. Safety, tolerability, and immunogenicity of COVID19 vaccines: a systematic review and meta-analysis. medRxiv 2020;, doi:
http://dx.doi.org/10.1101/2020.11.03.20224998 Preprint.

Legal Medicine 47 (2020) 101769

# Autopsies of COVID-19 deceased? Absolutely!

By Jan-Peter Sperhake
Department of Legal Medicine, University Medical Center Hamburg-Eppendorf
Butenfeld 34, D-22529 Hamburg, Germany

## ABSTRACT

Autopsies are an essential tool for understanding new diseases. Against this background, it is incomprehensible why there is great reluctance worldwide to perform autopsies on COVID-19 deceased patients. The article provides an overview of the status of the autopsy series published worldwide and shows the path taken by the city of Hamburg in Germany, where autopsies are ordered by the health authorities in the interests of disease control. The risk of infection posed by SARS-CoV-2-positive deceased persons may be overestimated. The scientific benefit that can be drawn from experience with autopsies and further examination of tissue samples is immeasurable.

## Introduction

At the end of 2019, the outbreak of a novel virus of the corona family, SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2), which causes COVID-19 (Corona Virus Disease 2019), began in Wuhan, China. Since then, a dynamic has developed worldwide, which first led to numerous cases of the disease in Asia and then in Europe. While in these parts of the world the infection activity has been contained for the moment by strong public restrictions (lock-down), the pandemic is now concentrated in North and South America, namely in countries such as the USA, India, Brazil, Chile and Peru. According to WHO data, there were 12,929,306 confirmed infections and 569,738 deaths worldwide on July 14th, 2020 [1].

## Autopsy activity in different countries

As soon as the pandemic reached the various countries, many of them began a wide range of scientific activities, focusing on the development of vaccines, the characterization of virus properties and clinical aspects of COVID-19. Initially, clinical and radiological data on the lungs of COVID-19 patients were available, but patho-morphological investigations were rarely undertaken. Naturally, the first publications on this subject came from China in February and March 2020, including results of lung biopsies of both living patients [2,3]

and deceased patients [4] being examined. The first published full autopsy with macroscopic photographs in a COVID-19 patient was provided in a medico-legal journal from China in February 2020 [5]. Systematic examinations of autopsies were missing until then.

It is not quite clear why there has been a certain reluctance to perform autopsies of patients who died of COVID-19 until today. It is true that in Germany the Robert Koch Institute (a German health monitoring institution)—at least in the initial phase of the pandemic—had advised against performing autopsies. However, the author is not aware of such clear votes against autopsies by other large health organizations such as the WHO, the Royal College of Pathologists (UK) or the CDC (USA). (Fulfillable) guidelines regarding minimum requirements for safe autopsies, e.g. concerning personal protection and room exhaustion, do exist, however [6–8].

Apparently autopsies are carried out here and there in the USA, which is particularly affected by COVID-19. Davis and Williamson published a letter in early June 2020, which deals with the risk of infection during COVID-19 autopsies [9]. A survey of 200 participating autopsy institutions has shown that at the time of writing there have been at least 225 autopsies in 14 states of the USA. For whatever reason, no major case series seem to have been investigated so far.

If publications on COVID-19 autopsy series are seen as an indicator for the autopsy frequency in the respective country, Germany, Italy, the USA, Switzerland, Austria and Great Britain seem to be countries where autopsies are performed at all—at least in individual centers. The studies used as a basis for this conclusion were PubMed-listed studies (search terms were COVID-19, SARS-CoV-2, autop* and post mort* in various combinations) whose case numbers go beyond mere case reports (which are of course also important) ($n > 2$; see Table 1). Postmortem study results also come from Brazil, China and France, but the tissue examined was obtained using different biopsy techniques ("minimally invasive autopsy").

## Procedure in Hamburg/Germany

In Germany, too, COVID-19 deaths have so far only been autopsied at a few locations. In Hamburg, the second largest city in Germany (1.8 million inhabitants), a special path was taken from the beginning. The health authorities of the districts ordered autopsies for all COVID-19 deaths according to the Infection Protection Act. Those autopsies have been performed in the Department of Legal Medicine of the University Medical Center Hamburg-Eppendorf. At the previous peak of the pandemic, it was not possible to autopsy all cases due to capacity reasons. Nevertheless, a full autopsy has been performed in 170 of the 231 deaths so far in Hamburg. Results of subsets are presented in various publications [16,29]. The world's largest series of 80 consecutive autopsies from

the Hamburg Department of Legal Medicine was presented by Edler et al. [10].

## Safety aspects

The main reason for the great reluctance worldwide to perform autopsies seems to be concerns about infectivity emanating from deceased persons. It remains somewhat unclear whether these concerns relate more to the health and safety of individual (forensic) pathologists, or to infection control in general. As far as the safety of the doctors and auxiliary staff involved in the autopsy is concerned, it must be objected that, in clinical pathology but particularly in forensic medicine every corpse must be considered potentially infectious. This starts with the risk of injuries, which can be an entry point for bacterial wound infections or viral diseases such as hepatitis C or HIV. But also diseases spread by air, such as meningococcal meningitis or tuberculosis, pose a real danger to the health of the autopsy staff. Often it is not even known that an infectious disease is present before the autopsy. Even if a disease like tuberculosis is known, an autopsy will still be performed with FFP2 or FFP3 mouthguards. Of course, other considerations apply in the case of highly infectious viral diseases with high mortality, such as Ebola.

Particularly in the case of sharply rising infection figures, as is currently the case in the USA or Brazil, the risk of encountering an unknown SARS-CoV-2-infected person if the autopsy is performed for other reasons, such as after homicide, is quite real. However, one will not be able to avoid such genuinely forensic autopsies with regard to latent risk of infection, which means that one must always protect oneself to a certain extent. But if the infection is known, specific precautions would be undertaken.

The literature is dominated by appeals for more autopsies to be performed [23,30–33]. Pomara et al. are particularly insistent on the necessity of autopsies in the COVID 19 pandemic [34]: "*Death can teach us not only about the disease, it might help with its prevention and, above all, treatment*." In this respect, it is actually hard to understand that there are also publications that expressly oppose the performance of autopsies.

Teresinski et al. claim [35]: "*In general, in case of deaths caused by confirmed SARS CoV-2 infections, there are no medical indications to conduct a postmortem examination*." Sapino et al. recommend [36]: "*Autopsies should be restricted to well-motivated cases [...]*" – without specifying which cases this should be. However, both recommendations were made in the early stages of the pandemic. Remarkably, Davis et al. registered only one case of infection in their survey after 225 autopsies, in which it is considered probable that the affected person was not infected by the autopsy but from community exposure [9]. Han et al. also report no disease symptoms in 6 participants after 24 COVID-19 autopsies [13].

In Hamburg, all autopsies were performed in a special autopsy room for infectious corps-

es (air suction directly at the autopsy table downwards). All persons involved wore FFP3 masks and the otherwise usual protective clothing. After more than 150 autopsies, there were no cases of disease or infection (PCR negative throat swabs, negative serology – unpublished data) among the approx. 25 persons involved (technical staff, doctors).

## Autopsy results

The autopsies made it possible to examine COVID-19-associated deaths more closely than would have been possible by purely clinical observations. In Hamburg, it was noticed after only a few autopsies that the frequency of deep vein thromboses and fatal pulmonary embolisms in the deceased COVID-19 patients was much higher than initially suspected [10,16] (see Figs. 1 and 2). Many of the lungs examined were very large, extremely heavy and brittle. The pleura as well as the cut surfaces showed a patterned juxtaposition of pale and hyperemic areas diffuse alveolar damage (DAD), the pathological equivalent of Acute Respiratory Distress Syndrome (ARDS), were present in the sense of an atypical viral pneumonia (Figs. 4 and 5). However, this was not the case in all patients. Some had rather the findings of a purulent bronchopneumonia, so that one can ask whether SARS-CoV-2 in these cases rather was the basis for bacterial superinfection. Among the 80 cases published by Edler et al. there were also those which, after autopsy, showed an alternative, COVID-19-independent cause of death (e.g. pericardial tamponade in myocardial rupture after myocardial infarction), which, strictly speaking, were COVID-19 disease cases but not COVID-19 deaths in a narrower sense [10].

The authors proposed a four-level classification scheme according to pathological-morpholo- gical criteria to take into account the variability of the deaths (category 1: certain COVID-19 deaths, category 2: probable COVID-19 death, category 3: possible COVID-19 death with an equal alternative cause of death, category 4: SARS-CoV-2 detection with cause of death not associated to COVID-19).

In all post-mortem studies with larger case numbers, the average age of the deceased was quite high at about 80 years. A shift towards younger ages, as in Carsana et al. (69 years), one must probably assume a selection effect, since although the autopsies were performed in consecutive deaths, only patients from certain referral centers were considered [11]. In contrast, the study by Edler et al., is more representative for the general population because all COVID-19-associated deaths of patients known to the authorities outside the clinics were also examined [10]. Clinically already known or autoptically detected co-morbidities (e.g. heart disease, lung disease, renal failure, diabetes, obesity, etc.) were frequently represented in all studies.

The study by Puelles et al. provided important findings, which were able to detect the virus in various organs such as kidneys, liver and brain [29]. Ackermann et al. were able to

show that angiogenesis in the lungs of deceased COVID-19 patients was enhanced compared to influenza patients [24]. These are examples of how autopsies open the door to many important branches of research.

## Conclusion

The results from the analyzed studies show that autopsies are essential in the COVID-19 pandemic. They enable a more differentiated assessment of mortality. More important than the determination of the cause of death, however, is the fact that only the autopsy (including histological and virological examinations) opens up the possibility of investigating the spread of the virus in the body, the involvement of various organ systems, but also the late effects of the disease—an aspect that is becoming increasingly important since, after more than 4 months of pandemic, there are many "recoveries" that may not have recovered as fully as had been hoped.

There are few valid reasons not to perform autopsies in COVID-19 deceased if the technical equipment meets certain minimum standards. It is easy to protect oneself against infection during the autopsy. Both clinical and forensic pathologists – preferably in cooperation – play an important role in gaining knowledge about the new disease as a basis for therapeutic measures and global pandemic control.

## Acknowledgments

The funding source of the study is the University Medical Center of Hamburg-Eppendorf, Hamburg, Germany. I would like to thank the whole Corona Team of our Department, namely (in alphabetical order) Sven Anders, Eric Dietz, Carolin Edler, Carla Falk, Antonia Fitzek, Daniela Fröb, Moritz Gerling, Axel Heinemann, Fabian Heinrich, Anna Kammal, Anke Klein, Inga Kniep, Philine Lange, Felicia Langenwalder, Kay Uwe Liebsch, Larissa Lohner, Malin Luther, Chiara Marino, Kira Meißner, Anna Mitakoudis, Herbert Mushumba, Klaus Püschel, Carina Romich, Alexandra Ron, Julia Schädler, Alina Schneider, Ann Sophie Schröder, Sandra Wilmes, Tamara Zimmermann, and all cooperation partners at the University Hospital.

References

[1] WHO Coronavirus Disease (COVID-19) Dashboard, https://covid19.who.int/, accessed 14 July 2020.
[2] S. Tian, W. Hu, L. Niu, et al., Pulmonary pathology of early-phase 2019 novel coronavirus (COVID-19) pneumonia in two patients with lung cancer, J. Thorac. Oncol. 15 (2020) 700–704.

[3] H. Zhang, P. Zhou, Y. Wei Y, et al., Histopathologic changes and SARS-CoV-2 immunostaining in the lung of a patient with COVID-19, Ann. Intern. Med. 172 (2020) 629–632.
[4] Z. Xu, L. Shi, Y. Wang, et al., Pathological findings of COVID-19 associated with acute respiratory distress syndrome, Lancet Respir. Med. 8 (2020) 420–422.
[5] Q. Liu, R.S. Wang, G.Q. Qu, et al., Gross examination report of a COVID-19 death autopsy, Fa Yi Xue Za Zhi 36 (2020) 21–23.
[6] WHO, Infection prevention and control for the safe management of a dead body in the context of COVID-19, (2020) https://apps.who.int/iris/handle/10665/331538, accessed 11 July 2020.
[7] CDC, Collection and submission of postmortem specimens from deceased persons with known or suspected COVID-19, (2020) https://www.cdc.gov/coronavirus/ 2019-ncov/hcp/guidance-postmortem-specimens.html#background, accessed 11 July 2020.
[8] The Royal College of Pathologists, Autopsy practice relating to possible cases of COVID-19 (2019-nCov, novel coronavirus from China 2019/2020) https://www.rcpath.org/uploads/assets/d5e28baf-5789-4b0f-acecfe370eee6223/fe8fa85a-f004- 4a0c-81ee4b2b-9cd12cbf/Briefing-on-COVID-19-autopsy-Feb-2020.pdf, accessed 11 July 2020.
[9] G.G. Davis, A.K. Williamson, Risk of COVID-19 transmission during autopsy, Arch. Pathol. Lab. Med. (2020), doi: 10.5858/arpa.2020-0345-LE. Online ahead of print.
[10] C. Edler, A.S. Schröder, M. Aepfelbacher, et al., Dying with SARS-CoV-2 infection-an autopsy study of the first consecutive 80 cases in Hamburg, Germany, Int. J. Legal Med. 134 (2020) 1275–1284.
[11] L. Carsana, A. Sonzogni, A. Nasr, et al., Pulmonary post-mortem findings in a series of COVID-19 cases from northern Italy: a two-centre descriptive study, Lancet Infect. Dis. (2020) doi: 10.1016/S1473-3099(20)30434-5. Online ahead of print.
[12] R.A.A. Monteiro, A. Nunes Duarte-Neto, L.F.F. da Silva, et al., Ultrasound-guided minimally invasive autopsies: A protocol for the study of pulmonary and systemic involvement of COVID-19, Clinics (Sao Paulo) (2020) 75:e1972, https://doi.org/10. 6061/clinics/2020/e1972.
[13] B. Han, R. Bhall, F. da Silva Lameira, et al., COVID-19 Autopsies and Personal Protective Equipment, Arch. Pathol. Lab. Med (2020) doi: 10.5858/arpa.2020- 0341-LE. Online ahead of print.
[14] T. Menter, J.D. Haslbauer, R. Nienhold, et al., Post-mortem examination of COVID19 patients reveals diffuse alveolar damage with severe capillary congestion and variegated findings of lungs and other organs suggesting vascular dysfunction, Histopathology, (2020) doi: 10.1111/his.14134. Online ahead of print.
[15] M. Dell'Aquila, P. Cattani, M. Fantoni, et al., Postmortem swabs in the Sars-CoV-2 Pandemic: Report on 12 complete clinical autopsy cases, Arch. Pathol. Lab. Med. (2020) doi: 10.5858/arpa.2020-0362-SA. Online ahead of print.
[16] D. Wichmann, J.-P. Sperhake, M. Lütgehetmann, et al., Autopsy findings and venous thromboembolism in patients with COVID-19, Ann. Intern. Med. (2020) doi:10. 7326/M20-2003. Online ahead of print.

[17] T. Schaller, K. Hirschbühl, K. Burkhardt K, et al., Postmortem examination of pa- tients with COVID-19, JAMA 323 (2020) 2518–2520.
[18] S.F. Lax, K. Skok, P. Zechner, et al., Pulmonary arterial thrombosis in COVID-19 with fatal outcome: Results from a prospective, single-center, clinicopathologic case series, Ann. Intern. Med. (2020) doi:10.7326/M20-2566. Online ahead of print. A. Nunes Duarte-Neto, R.A. de Almeida Monteiro, L.F.F. da Silva, et al., Pulmonary and systemic involvement of COVID-19 assessed by ultrasound-guided minimally invasive autopsy, Histopathology (2020), https://doi.org/10.1111/his.14160 Online ahead of print.
[19] S.E. Fox, A. Akmatbekov, J.L. Harbert, et al., Pulmonary and cardiac pathology in African American patients with COVID-19: an autopsy series from New Orleans, Lancet Respir. Med. (2020) doi: 10.1016/S2213-2600(20)30243-5. Online ahead of print.
[20] X. Xu, X.N. Chang, H.X. Pan, et al., Pathological changes of the spleen in ten pa- tients with coronavirus disease 2019(COVID-19) by postmortem needle autopsy, Zhonghua Bing Li Xue Za Zhi 49 (2020) 576–582.
[21] J.H. Wu, X. Li, B. Huang, et al., Pathological changes of fatal coronavirus disease 2019 (COVID-19) in the lungs: report of 10 cases by postmortem needle autopsy, Zhonghua Bing Li Xue Za Zhi 49 (2020) 568–575.
[22] E. Youd, L. Moore, COVID-19 autopsy in people who died in community settings: the first series, J. Clin. Pathol. (2020) doi: 10.1136/jclinpath-2020-206710. Online ahead of print.
[23] M. Ackermann, S.E. Verleden, M. Kuehnel, et al., Pulmonary vascular endothelialitis, thrombosis and angiogenesis in Covid-19, NEJM 383 (2020) 120–128. M.C. Copin, E. Parmentier, T. Duburcq, et al., Time to consider histologic pattern of lung injury to treat critically ill patients with COVID-19 infection, Intensive Care Med. 46 (2020) 1124–1126.
[24] H. Bösmüller H, S. Traxler, M. Bitzer, et al., The evolution of pulmonary pathology in fatal COVID-19 disease: an autopsy study with clinical correlation. Virchows Arch. (2020) doi: 10.1007/s00428-020-02881-x. Online ahead of print.
[25] L.M. Buja, D.A. Wolf, B. Zhao, et al., The emerging spectrum of cardiopulmonary pathology of the coronavirus disease 2019 (COVID-19): report of 3 autopsies from Houston, Texas, and review of autopsy findings from other United States cities, Cardiovasc. Pathol. (2020), https://doi.org/10.1016/j.carpath.2020.107233.
[26] X.H. Yao, T.Y. Li, Z.C. He, et al., A pathological report of three COVID-19 cases by minimal invasive autopsies, Zhonghua Bing Li Xue Za Zhi 49 (2020) 411–417. V.G. Puelles, M. Lütgehetmann, M.T. Lindenmeyer, et al., Multiorgan and renal tropism of SARS-CoV-2, NEJM (2020), https://doi.org/10.1056/NEJMc2011400. H. Ledford, Autopsy slowdown hinders quest to determine how coronavirus kills, Nature. (2020) doi: 10.1038/d41586-020-01355-z. Online ahead of print.
[27] R.F. Barth, X. Xu, L.M. Buja, A call to action: the need for autopsies to determine the full extent of organ involvement associated with COVID-19, Chest (2020), https:// doi.org/10.1016/j.chest.2020.03.060 Online ahead of print.
[28] B. Cong B, Academician Cong Bin: Autopsy of SARS-CoV-2 infection is needed to be

strengthened Fa Yi Xue Za Zhi 36 2020 4 5.
[29] A. Tzankov, D. Jonigk, Unlocking the lockdown of science and demystifying COVID-19: how autopsies contribute to our understanding of a deadly pandemic, Virchows Arch. (2020), https://doi.org/10.1007/s00428-020-02887-5 Online ahead of print. C. Pomara, G. Li Volti, F. Cappello, COVID-19 deaths: Are we sure it is pneumonia? Please, autopsy, autopsy, autopsy!, J. Clin. Med. (2020), https://doi.org/10.3390/ jcm9051259.
[30] G. Teresiński, T. Jurek, Recommendations of the polish society of forensic medicine and criminology and national consultant for forensic medicine with regard to performing forensic post-mortem examinations in case of confirmed COVID-19 disease and suspected SARS CoV-2 infections, Arch. Med. Sadowej. Kryminol. 69 (2019) 147–157.
[31] A. Sapino, F. Facchetti, E. Bonoldi, et al., The autopsy debate during the COVID-19 emergency: the Italian experience, Virchows Arch. 476 (2020) 821–823, https:// doi.org/10.1007/s00428-020-02828-2.

---

Diagnostics • January 28th, 2021

# Died with or Died of? Development and Testing of a SARS CoV-2 Significance Score to Assess the Role of COVID-19 in the Deaths of Affected Patients

By Arianna Giorgetti 1, Vasco Orazietti 2, Francesco Paolo Busardò 2
Filippo Pirani 2,* and Raffaele Giorgetti 2

Department of Medical and Surgical Sciences, Unit of Legal Medicine
University of Bologna, Via Irnerio 49, 40126 Bologna, Italy; ari.giorgetti@gmail.com
Department of Excellence of Biomedical Sciences and Public Health,
University "Politecnica delle Marche" of Ancona, Via Conca 71, 60126 Ancona, Italy
vasco.orazietti@gmail.com (V.O.);
f.busardo@staff.univpm.it (F.P.B.);
r.giorgetti@staff.univpm.it (R.G.).

## ABSTRACT

Since December 2019, a new form of coronavirus, SARS-CoV-2, has spread from China to the whole word, raising concerns regarding Coronavirus Disease 2019 (COVID-19) endangering public health and life. Over 1.5 million deaths related with COVID-19 have been

recorded worldwide, with wide variations among countries affected by the pandemic and continuously growing numbers. The aim of this paper was to provide an overview of the literature cases of deaths involving COVID- 19 and to evaluate the application of the COVID-19 Significance Score (CSS) in the classification of SARS CoV-2-related fatalities, comparing it with the Hamburg rating scale. The results obtained allowed us to highlight that CSS used after a complete accurate post-mortem examination, coupled to the retrieval of in vivo data, post-mortem radiology, histology and toxicology, as well as to additional required analyses (e.g., electronic microscopy) is a useful and concise tool in the assessment of the cause of death and the role played by this virus. A shared use of this scale might hopefully lower the inhomogeneities in forensic evaluation of SARS CoV-2-related fatalities.

## Introduction

In December 2019, starting from the urban area of Wuhan, a new form of coronavirus, SARS CoV-2, began to spread firstly to a national level, and rapidly to the whole world. Its diffusion was so fast that on March 11, the World Health Organization (WHO) declared Coronavirus Disease 2019 (COVID-19) a pandemic [1]. At the time of the present article (December 2020), the cases of COVID-19 registered in the world have reached 68,679,195, with 47,583,441 patients completely recovered. Active cases amount to 19,530,028, 0.5% of which are in severe or critical conditions. Most affected countries include the United States, India and Brazil. Deaths related to COVID-19 amount to 1,565,726, with wide variations among countries affected by the pandemic and continuously growing numbers [2].

Global research efforts have been, since then, focused on studying the natural history of the disease, the immune responses, rapid and reliable diagnostic testing and on understanding the mechanisms underlying the clinical picture, with the aim of better treating affected patients and developing an effective vaccine as soon as possible. Although several vaccines have shown promising results in phases 2 and 3 of the experimental studies [3,4], long-term effects of COVID-19 and of related counteracting drugs and therapies might continue for years. The COVID-19 death toll is reported everyday nation by nation and is one of the main aspects of health surveillance, which guides health and social policies.

In this context, the distinction between "died from" and "died with" COVID-19 still represents an under-addressed and unsolved issue [5,6]. Often it is a difficult task for a medical practitioner to establish into which of these categories a death falls; indeed, distinguishing between "dying with" and "dying from" COVID-19 requires more complex investigation into the cause of a death, beyond citing a positive SARS-CoV-2 test. Although some clinical conditions, as well as laboratory and imaging alterations, are known to be associated with a worse outcome [7–13], there are still difficulties in classifying COVID- 19 related

deaths [14], due to the lack of consensus criteria. Throwing light on what is being counted as a COVID-19 death is also essential to understand the impact of the virus and to inform the public. According to the "International guidelines for certification and classification of COVID-19 as cause of death", published last April by the World Health organization (WHO) and based on the International Classification of Diseases (ICD), a clinical-based categorization of COVID-19 deaths can be performed by recording a pathophysiological sequence of the clinical conditions leading to death, as well as other contributing causes [15,16]. Medical certifications of death compiled for research and surveillance purposes by treating physicians have relevant consequences, e.g., they might bias scientific studies for the development of clinical risk prediction models or prevent the development of public health safety measures [17,18]. COVID-19 might be a direct cause, an underlying cause of death or a contributing condition. Even probable infections are acceptable in death certificates and do not necessarily point to the need for a judicial autopsy or a coroner intervention, even if it is a notifiable disease [15]. Though most autopsies are not necessary for laboratory-confirmed deaths [15], in the absence of a probable cause of death or when there is a suspect of medical liability, a post-mortem examination might be necessary [15,17]. It is well documented that the clinical cause of death might not coincide with the pathological one [19,20] and, notwithstanding increasingly accurate laboratory and instrumental techniques, the role of the autopsy still remains relevant [21]. Since this virus belongs to Hazard group 3, in the early stages, very few autopsies were performed on COVID-19 patients, leading to a loss of valuable information. With the aim of reducing biological risk for contagion, several guidelines have been developed [22–31]. While some authors have proposed the use of "special autopsy facilities", others promoted a shift towards minimally invasive autopsies, performed by ultrasound-guided biopsies in different organs [32,33]. However, the latter may not provide a complete picture, making it difficult to answer questions about exact causes of death and SARS CoV-2 liability.

## 2. COVID-19 Significance Score (CSS)

As recently reported, a COVID-19 Significance Score (CSS) has been proposed [34]. The CSS classifies fatalities involving COVID-19 into four categories, 0, 1, 2 and 3 (as also suggested in other forensic disciplines, e.g., toxicology) [35,36]:

0: COVID-19 is merely an occasion; it has no role in the patient's death.
1: A role of COVID-19 in the patient's death cannot be excluded, although an alternative cause of death is likely.
2: COVID-19 likely contributed to the death, together with other factors that may have played a prominent role.
3: COVID-19 is the leading cause of death.
U (unclassified or unclear), when not enough data are available, when further instrumental and laboratory tests are needed to clarify the situation or when the role of COVID-19

remains unclear despite all tests and analyses.

In the application of the CSS, the following features must be taken into consideration: Presence and severity of COVID-19, considering both in vivo and postmortem data (natural history of disease, results of upper and lower airway swabs, clinical records, laboratory tests).

Presence and severity of co-morbidities. It has been widely demonstrated that the presence of co-morbidities is more frequently related to a different natural history in SARS-Cov-2 infection.

Circumstances of death. External traumatic events, e.g., a fatal car accident, involving a patient infected by SARS CoV-2 might rule out the responsibility of the virus in the death. This might be less evident in suicides. Indeed, cases of Corona Suicide have been reported worldwide [37] and COVID-19 might play an indirect role, by ingenerating fear, burden and a sense of responsibility for having infected other people, especially the closest relations.

Post-mortem imaging. Together with the tests performed in vivo or individually, post mortem radiology, including X-rays and post-mortem computed tomography (PMCT), may offer prominent information about the severity of the infection, as well as on any other alterations not clinically appreciable. However, due to the biological risk, these examinations should be carried out according to appropriate safety protocols and in any case should not hinder the hospital routine.

Macroscopic and microscopic autopsy findings. Autopsy plays a central role in the development of this score, as information that can be obtained from this examination cannot be provided by any other imaging or laboratory test.

Toxicological evaluation. A screening of the most common substances of abuse could be useful to exclude acute intoxications. As often happens in comorbid patients, the consumption of multiple drugs might lead to adverse events and exitus even at concentrations lower than the toxic levels, due to synergistic effects. Insufficient dosages of a necessary drug might as well explain a death and these possibilities require a quantitative analysis.

Additional analyzes. When required by the case in question, such as bacterial culture, virological tests and other specific exams.

The aim of the present work is to provide an overview of the literature cases of deaths involving COVID-19 and to evaluate the application of the CSS in the classification of SARS CoV-2-related fatalities, comparing it with other rating scales currently available.

# 3. Material and Methods

## 3.1. Literature Review and Data Extraction

A systematic review of the available literature was performed, seeking information regarding post-mortem examinations performed on the deceased who had tested positive for SARS Cov-2, with the infection confirmed in vivo and/or after death (topic of the search and main inclusion criteria). Data was collected from May 2020 to August 2020, by performing a search on an international database (Pubmed) using the following search terms. The keyword "covid" (variably written) was linked through the Boolean operator "AND" to the following terms, alternatively: "autopsy", "full autopsy", "post-mortem".

Inclusion criteria were: relevance to the topic; English, Spanish, German or Italian language; date of publication (up to 31 July 2020); retrievability of a full-text.

Papers that did not report the results of a post-mortem examination, e.g., publications dealing with the health care personnel safety or technical aspects of post-mortem examinations, cases analyzed only by post-mortem biopsies performed on a single organ and papers from which individual patient data could not be extracted, were excluded from the work (exclusion criteria). A database with the results was created in Microsoft Excel and the following data, organized in two sections, were extracted. In vivo data: in addition to the patient's personal details (age and sex), the history of the disease, any co-morbidities, medications taken before and during the SARS CoV-2 infection, information about the swab, laboratory and imaging (e.g., X-rays and computed tomography or CT) data.

Post-mortem data: death circumstances, any post-mortem imaging examinations, type of postmortem examination (full, partial, histology), macro and microscopic features emerged from the autopsy and related analyses, cause of death (when specified) and the role played by SARS CoV-2 as reported by the authors.

## 3.2. CSS Guiding Tool Development and Score Application

A short and easy guiding tool has been developed in order to facilitate the application of the CSS across original points 1 to 6 [34]. The features considered in this guide refer to the most frequent pictures described in literature to date. For this reason, the CSS is not to be considered as a definitive tool, but susceptible to modifications and improvements along with the progress of the state of the art.

• in vivo and/or post mortem positivity of the swab for SARS CoV2 (YES/NO)

• any reported symptoms compatible with COVID-19 (YES/NO) and severity of them (MILD, MODERATE = the situation required non-invasive techniques, SEVERE = the situation re-

quired invasive techniques, such as intubation)

• any symptoms referable to other causes (YES/NO)

• drug therapy administered during COVID-19

• any changes in laboratory tests compatible with COVID-19 (YES/NO)

• any alterations in the laboratory tests due to other causes (YES/NO)

• evidence of bacterial, fungal or viral superinfection (YES/NO)

• radiological evidence (X-ray, CT compatible with COVID-19) (YES/NO)
• presence (YES/NO) and number of co-morbidities (1, 2 OR MORE)

• severity of co-morbidities

• drugs consumed prior to COVID-19

• external traumatic cause of death (e.g., car accident, gunshot, electrocution, drowning) or suicidal/homicidal manner of death (YES/NO)*

• radiological evidence (XR, CT compatible with COVID-19) (YES/NO)

• presence of any other pathological alterations (YES/NO)

• macroscopic and/or microscopic findings compatible with COVID-19 (YES/NO)

• presence (YES/NO), type (as chronic obstructive pulmonary disease (COPD), cardiomyopathy, thromboembolism, coronary thrombosis] and severity of other pathological conditions

• presence of drugs/substances of abuse (YES/NO)

• presence and concentration of drugs taken regularly in chronic or during COVID-19.

• in case of suicide, the liability, even if indirect, for SARS CoV-2 cannot be excluded. Any useful information, such as a history of psychiatric pathologies, should therefore be evaluated carefully.

All literature cases were classified according to the CSS by three independent blinded in-

vestigators and the inter-rater agreement was assessed by non-parametric ANOVA.

## 3.3. The Hamburg Score

In a recent study performed at the University of Hamburg–Eppendorf, Edler et al. also proposed a classification system for deaths involving COVID-19 [38]. In the paper, the first 80 consecutive autopsies carried out on patients positive to COVID-19, who died in Hamburg, were reported. In fact, the approach used in the federal state of Hamburg is to examine all the deceased citizens with a confirmed SARS-CoV-2 infection, subjecting the bodies to a PMCT and performing a complete autopsy (by opening the three cavities and dissection of all organs).

The results of the exams are then progressively uploaded to a national register, with the purpose of collecting data from all the autopsies performed in Germany on COVID-19 patients.

Based on clinical information, PMCT and autopsy findings, the researchers propose a categorization of COVID-19 positive deaths, in order to determine whether the virus was the cause of death or whether exitus occurred independently from it.

This scale, just like the CSS, ranks COVID-19 related death into 4 categories: 1—definite COVID-19 death: autoptic pneumonia and/or acute respiratory distress syndrome (ARDS); 2—probable COVID-19 death: Autoptic pneumonia and/or ARDS and other infectious causes of death (e.g., pulmonary embolism); 3—possible COVID-19 death: cause of death that cannot be determined with certainty by autopsy (e.g., cardiac arrhythmia in cardiomyopathy) OR autoptic respiratory tract infection/pneumonia of other genesis (e.g., aspiration pneumonia, exacerbated COPD); 4—SARS-CoV-2 detection with cause of death not associated to COVID-19: Clear non-SARS-CoV-2-related cause of death (e.g., brain mass hemorrhage in hypertension, acute myocardial infarction in coronary thrombosis.

A death corresponding to categories 1–3 is defined as "COVID-19 death" (corresponding to CSS 3-1), therefore, COVID-19 related, while category 4 contains deaths not related to COVID-19 (corresponding to CSS = 0).

Within the post-mortem cases reported by the University of Hamburg–Eppendorf, the mean among the CSS assigned by the three raters and the Hamburg scores were compared by means of non-parametric t-test.

# 4. Results
## 4.1. Literature Review

Thirty articles were included in the present literature review, corresponding to 84 post mortem examinations. Results of the selection process are shown in Figure 1, and detailed data for each case are reported in Table 1. Fourteen studies describe multiple cases [39,40 ,41,42,43,44,45,46,47,48,49,50,51,52], while 16 were case reports [53,54,55,56,57,58,59,60, 61,62,63,64,65,66,67,68]. The highest sample size corresponded to 14 cases.

Victims were mostly male (58 cases), with a mean age of 65.3 years (median: 70.5, lower limit: 17, 25% percentile: 55.5; 75% percentile: 76.0; upper limit: 91). Since the exact age was not reported in two cases, defined as "middle aged", in the mean calculation they were both considered to be 55 years old. All the cases tested positive for SARS CoV-2 RNA, with swabs performed in vivo and/or post-mortem. Seventy-four victims had co-morbidities, though no information was reported in 5 cases, and of these, the majority (56 cases) had 2 or more diseases, up to a maximum of 14. The most frequently reported were: arterial hypertension (in 41 cases, 55%), diabetes mellitus (in 28 cases, 37.8%) and obesity (in 24 cases, 32.4%).

Signs and symptoms of SARS Cov-2 infection were reported in 65 out of 84 cases. Respiratory symptoms were described in 50 cases, fever in 47, cough in 34. Fatigue/myalgia (11 times), gastrointestinal symptoms (10 times), alterations of consciousness, e.g., delirium/ confusion/syncope (8 times), chills (6 times), tachycardia (5 times) and headache (4 times) were less common. Even more rarely hypotension, incontinence, chest pain and balance disorders (like dizziness/postural instability), described each in 2 cases, were reported. Acute kidney injury, acute cardiomyopathy, bradycardia, atrioventricular block, cardiac arrest, hemoptysis, hematuria, sore throat, sinusitis and anorexia were reported only one 1 time. In one case, unspecified systemic symptoms were described. Among the 49 cases whose laboratory abnormalities were reported, the most frequently encountered changes were elevated c-reactive protein (CRP) (51%), lymphocytopenia (46.9%), elevated lactate dehydrogenase (LDH) (38.7%), elevated creatinine (26.5%), elevated D-dimer (24.4%), leukocytosis (22.4%). Other alterations, such as in the values of fibrinogen, troponins, ferritin and Il-6, were rarely found.

Data on medications were available in 13 patients, 12 of whom were taking therapy for their previous conditions, while drugs administered during COVID-19 were reported in 55 out of 84 cases. The most common drugs included antibiotics (52.7%), antivirals (34.5%), hydroxychloroquine (32.7%), vasopressors (10, 18.1%), corticosteroids (12.7%), anticoagulants and heparins (12.7%) and biologics (10.9%). Diuretics, pain relievers and other medications were used in less than 5 patients (9%). The use of non-invasive ventilatory

support was specified in 21 patients (38.1%), while 33 cases (60%) required intubation during hospitalization for COVID-19. Finally, 6 patients underwent hemodialysis (10.9%), while extracorporeal membrane oxygenation (ECMO) was used in 2 of them (3.6%).

The majority (73) of the deaths occurred in a hospital setting, i.e., intensive care or other wards, while among the 11 out of the hospital cases, 3 occurred in nursing homes, 5 patients were found dead in their homes, 1 in his car, while in 2 cases the data were not extractable. Post mortem examinations performed included complete autopsies (29 cases), partial autopsies (33 cases) and post mortem histology (22 cases). The histological samples involved the lung in all the 22 cases, heart in 10 cases, liver in 13, airways in 7, kidney in 2 and gastrointestinal tract in 2.

Imaging studies have been reported in 65 cases. Of these, in vivo imaging was performed in 50, post mortem in 14, both in 1. On in vivo radiographs, the most commonly reported features were bilateral patchy opacities and/or consolidations (60.7%), and 39.2% of chest CT showed ground glass opacity and/or consolidations. Post-mortem chest X-ray was performed in 2 cases and displayed bilateral opacities, while by PMCT, various degrees of pulmonary consolidation (80%), presence of reticular pattern (60%), pleural and/or pericardial effusions (40%) were described, as well as less represented features, e.g., emphysema, ground glass opacities and evidence of neoplastic lesions.

As for the autopsy room, macroscopic changes were described in several organs, although with a variable frequency, also caused by pre-existing pathologies. The most affected organs were lungs/airways in 51 of 54 cases, heart and vascular system in 33, liver in 12, kidneys in 11, spleen in 9, lymph nodes in 6 and CNS in 5 cases. Lungs were commonly described as heavy and edematous, with or without intraparenchymal hemorrhages or emboli. A macroscopic feature of pneumonia was also quite frequent, while purulent infections, empyema or green exudate were rarer. Extra-pulmonary common features included heart hypertrophy, though this is unlikely connected with COVID-19, enlargement of the spleen and of the lymph nodes. Alterations found in the gastrointestinal tract, prostate, skin, testis and other anatomical parts were much rarer. A similar picture was found in microscopic examinations of tissues, with lung/airways affected in all the 84 cases, liver in 40, heart and vascular system in 37, kidney in 25, spleen in 13, lymph nodes in 7, gastrointestinal tract in 3. Alterations reported in the CNS, bone marrow, testis and thyroid had lower frequencies. The most described finding within lung tissues was represented by diffuse alveolar damage (DAD) in exudative or organizing phases, coupled to pulmonary edema, hemorrhages and microthrombi. Less commonly, slight fibrosis, atypical pneumocytes or acute inflammatory infiltrates were noted. Microthrombi, together with signs of acute or chronic inflammation, were also reported in the trachea. Haemophagocytosis was occasionally noted in lymph nodes. In the heart, fibrosis and myocardiocyte hypertrophy have been mostly observed. In the liver, the dominant microscopic picture found was mild to

severe hepatic steatosis, though portal/periportal inflammation, hepatocyte necrosis and hepatic congestion have been also described. The spleen commonly showed hyperplasia of the white pulp. In the kidney, arteriolosclerosis was the most frequently encountered finding, often related to chronic hypertensive damage and diabetes.

Regarding other examinations carried out, 9 electron microscopy tests were performed. In 8 of these 9 cases, the authors found viral-like particles within cells of different tissues (such as tracheal epithelial cells, pneumocytes, enterocytes, renal tubular cells). In the remaining case, no viral-like particles were found, but neutrophils in the alveolar capillaries and fibrin deposits in the alveolar spaces were documented. Moreover, the presence of bacteria, fungi or viruses in addition to SARS CoV-2 was documented in 7 of the patients by using cultural tests, rt-PCR and other laboratory tests. In 2 cases, toxicological investigations were also carried out, finding dextromethorphan in one patient (part of the antitussive therapy taken during COVID-19) and in another patient caffeine and naloxone. Causes of death were reported in 71 decedents, while the role of COVID-19 was specified 51 of them, being considered "cause of death" in 37 cases (72.5%), "contributing factor" in 12 (23.5%) and "significant factor" in 2 (3.9%). A summary of the results is shown in Figure 2.

## 4.2. CSS Application

The COVID-19 Significance Score was applied to each case found in the literature review. The non-parametric ANOVA comparing the CSS assigned by three independent blinded investigators did not show significant differences ($p > 0.05$). Complete agreement was found in 68 cases. As shown in Table 2, 57 of the 84 reported deaths fell into CSS category 3 for at least 2 raters, which means that "COVID-19 was the leading cause of death".

Twenty-two of the deaths fell into category 2 for at least two raters. In these cases, "COVID-19 likely contributed to the patient's death, together with other factors that may have played a prominent role". Four deaths were included in category 1, where "an alternative cause of death was likely", by at least two raters. In one case, CSS was classified as U by two raters, further specific investigation being necessary, and as 0 for the third one.

## 4.3. Hamburg Score

The two classifications of deaths were compared in the cases reported in this work also described in the study by Edler et al., specifically in 13 of the 84 deaths collected in this paper (Table 2). Considering the Hamburg category 1 (defined COVID-19 death) equivalent to the CSS category 3, and the Hamburg category 2 (probable COVID-19 death) equivalent to the CSS category 2, the results of the two classification systems agreed in 8 out of the 13 cases. In the remaining 5 cases, differences in assessment emerged. Particularly:

A. in cases 1, 3, 4, 12 by Wichmann et al. [40], CSS classified COVID-19 as the cause of death (CSS = 3), while the Hamburg score revealed a probable COVID-19 death (corresponding to CSS = 2);

B. in case 2 by Wichmann et al. [40], CSS classified COVID-19 as the cause of death (CSS = 3), while Hamburg scored the fatality as possible COVID-19 death (corresponding to CSS = 1).

C. The t-test between the average CSS score and the Hamburg score, converted into CSS, did not yield a statistical significant difference.

# 5. Discussion

Information about 84 deaths involving SARS CoV-2 positiveness or infection have been collected in the present study, showing the growing interest of the literature with respect to post-mortem findings in COVID-19 pandemic.

So far, several tests have been developed in order to confirm a patient's positivity to the virus, none of them free from issues of sensitivity [31]. The most used is certainly rt-PCR performed on swabs collected from the upper airways. All patients included in this study tested positive for airway swabs, performed in vivo or post-mortem. However, the accuracy of post-mortem swabs is yet to be clearly defined and false negative are theoretically possible [69]. Indeed, even though different studies report positive swabs even after several days, the influence of post-mortem interval and bacterial superimposition is unknown. One study suggested it might be reliable until 5 days [70]. C. Edler et al. verified the post-mortem sensitivity of the nasopharyngeal and oropharyngeal swabs by performing the test on 30 deceased at the time of dissection, finding a positive swab in 100% of cases, with a maximum time elapsed from death to the test of 12 days [38]. Furthermore, a study by Marco Dell'Aquila et al. highlighted the importance of performing multiple swabs in the post-mortem examination [71]. COVID-19 has been detected by nasopharyngeal and oropharyngeal swabs up to 27 h after death [72], while in another study the positivity of throat swabs lasted up to 128 h [73]. By performing rhino-pharyngeal, tracheal and lung swabs in 12 autopsy cases of patients with a clinical diagnosis of Sars-CoV-2 related pneumonia, 9 out of 12 cases had at least one post-mortem swab positive for Sars-CoV-2, with the virus found in samples up to 310 h from the post mortem sampling [71]. Moreover, a paper by Prema Seetulsingh et al. described the case of a patient who died of respiratory failure during transport to the hospital, with a negative upper airway swab, but with SARS CoV-2 found in the lung at an analysis performed 27 days following the death [74]. However, a correlation between the negativity of the lung swabs and the number of days elapsed from the ante mortem swabs was also found, as well as a negative correlation between the positivity of the other swabs and the number of days passed from the ante

mortem swabs [71]. Thus, results of swabs should be interpreted with caution and never taken as an evidence of COVID-19 when singularly considered.

As a matter of fact, despite multiple reports allowed to assess the vitality of SARS CoV-2, scientific evidence regarding the risk of becoming infected for health care personnel arising from human dead hosts is lacking. Notwithstanding this, the risk of contagion involved in the post-mortem examination led some countries to discourage the performance of autopsies, as happened in Italy [75]. This might explain why the number of cases here considered, although significant, is rather low when compared to the high worldwide mortality for COVID-19. An additional possible explanation for the decline of the autopsy rate might be connected to the guidance for the safe management of a dead body, published by the World Health Organization and by the Center for Disease Control and Prevention [76,77]. Indeed, not all the autopsy facilities could be equipped with the required safety measures (e.g., negative pressure rooms) and the lack of "safe" autopsy rooms might have additionally led to a reduction in postmortem examinations [69,76].

The epidemiology of the victims, and the rate of co-morbidities (absent in 28% of the cases), do not allow to confirm that SARS-CoV-2 is only affecting the elderly or patients who bear in already critical conditions. Rather, this is a confirmation that COVID-19 can be lethal even in healthy people and this should be taken in mind by forensic pathologists, who might incur in an otherwise unexplained death. As for the history of the disease, reported symptoms, laboratory alterations and macro as well as microscopic findings of the cases collected in this study were in line with those reported by other works, showing a prevalence of lung damage with edema, acute and late phase of DAD, presence of microthrombi in the pulmonary vessels or pneumonia [78,79,80,81,82,83], but also involvement of other organs, such as kidneys, heart and liver [84,85,86,87]. This also highlights that investigations limited to the lungs might not be enough to obtain a clear clinical post-mortem picture. Moreover, the complexity of the histological features shown even within the lungs might suggest that a biopsy-based approach might not be representative of the whole parenchyma.

As for the type of analyses performed, in vivo imaging was far more common than in the post-mortem setting (only 15 cases). Particularly, post-mortem imaging was performed when in vivo instrumental analysis was missing, e.g., cases 1,3,5,7–12 by Dominic Wichmann et al. [40], and its concordance or discordance with pathological findings allowed a high inter-rater agreement in the assignment of the CSS. Its application is strongly encouraged, especially when other info might be missing. Toxicology was extremely rarely applied. However, several drugs were administered before and during COVID-19 in most cases and, in this condition, it would appear reasonable to confirm the effectiveness of the administration, e.g., by excluding under- as well as over-doses.

A rather worrying picture emerged from the type of post-mortem examination performed, since the majority of cases (55 in total, out of 84) were not complete, nor performed with respect to the international guidelines [88,89]. Indeed, even though micro-invasive autopsies, especially if coupled to post-mortem imaging and extensive sampling of tissues for histology and electronic microscope-based analyses, might represent a viable alternative to reduce the risk of infection for health care personnel, the exclusion of some organs (most often, the brain) or the loss of a global view on the health status of the victim might lead to false conclusions. Especially in the case of such a widespread and systemic infection as COVID-19, which might affect multiple organs and lead to an unpredictable and severe immune response, the careful dissection of each organ appears of paramount importance. Indeed, a full autopsy is the only chance to observe the systemic changes and take optimal samples to identify the cause of death [28].

As already emerged for some toxicological issues, when the scientific data are scarce [35,36], a multidisciplinary evaluation is necessary and shared criteria might aid forensic pathologists in their delicate task, which has many consequences.

By observing the CSS applied to the collected cases, it can be noted that most of the deceased fall into the category "deaths from COVID-19". A similar result is reported by an interesting study by Francesco Grippo et al. [5] By analyzing more than 5000 death certificates compiled according to the ICD, it was observed that COVID-19 was reported as the leading cause of death in 88% of cases. Sefer Elezkurtaj also confirms, by performing autopsies on 26 patients, that in the majority of decedents, the causes of death were directly related to SARS CoV-2 [90]. According to this study, the majority of patients had "died of COVID-19", with only a contributory implication of pre-existing health conditions to the mechanism of death. However, the influence of a publication bias should be considered.

The very good agreement found by three blind and independent raters allows to hypothesize that the CSS is an easy tool which could be applied in the everyday routine of post-mortem examination on SARS-CoV-2 positive deceased, even by less experienced pathologists. Regarding the comparison with the Hamburg score by Edler et al. [38], as previously mentioned, it was not possible to apply that categorization in all cases, but only in the autopsies performed in Hamburg which were also reported in the studies by Wichmann et al. [40] and Heinrich et al. [57]. The study of the University of Hamburg, in fact, collected the key points of the first 80 consecutive autopsies carried out in the federal state of Hamburg, then applied a categorization of deaths on the basis of the causes of death reported, making this scale not usable in different studies. Furthermore, the 80 cases described by Edler et al. do not contain extractable information, particularly regarding post-mortem findings [38]. Therefore, they could not be included in our database of literature cases. The Hamburg score mostly considered the findings of "pneumonia", "ARDS" and "pulmonary embolism" as indicators for a COVID-19-related death. Even if these findings

are certainly fundamental in the evaluation of the role of SARS-CoV-2, we believe that a more comprehensive overview, as well as a valorization of past history and of the status of the other organs and functions (e.g., of coagulation), are needed. For example, findings of aspiration pneumonia in a patient with neurological co-morbidities might be misinterpreted as SARS-CoV-2-related, when they might have occurred even in the absence of this pathogen and in any moment of the patient's life (e.g., case 6 by Wichmann et al. [40], assigned CSS = 1). This further underlies the importance of collecting in vivo data when performing a post-mortem assessment. Clinical risk prediction models (e.g., QCOVID) have already been developed and validated on large population sets, to estimate the risk of becoming infected and then of dying of COVID-19, or of dying when admitted to hospital with COVID-19 [18,91,92].

The quantification of such risks might be certainly useful even in the postmortem setting, and might give forensic pathologists strong indications on the most important clinical predictors of death. However, these statistical ex ante tools do not allow one to assess ex post the cause of death and the role of the virus in the specific evaluated case. Thus, in the post-mortem evaluation, clinical stratification risk models or image-based outcome models should be always integrated with the CSS [93].

Even though the results, by comparing the converted Hamburg score and the CSS, were not significantly different, this type of analysis has been made possible only in a minority of cases and further studies would be needed to establish whether they are interchangeable. Nevertheless, we agree that, when the cause of death is difficult to be ascertained, a high degree of suspicion for COVID-19 should be maintained, and this probably had a reflection in the above-mentioned high degree of CSS 3 and 2 assigned.

Beside the difference in numbers among cases classified by Hamburg score and by CSS, the study has several limitations. Until July 31, only a few reports of complete autopsies had been published. The early publication of the present study has the aim to provide a quick overview and practical instruments which might be helpful for further cases evaluation. Despite the diffusion of safety protocols, very often these were not applied due to the infectious risk, preferring minimally invasive approaches such as ultrasound guided biopsies or partial autopsies, by opening of the thoracic and abdominal cavity, but leaving the organs in situ. Additionally, not all the articles reported information such as laboratory tests performed, co-morbidities, circumstances of death and radiology. Regarding the swabs, all cases found were positive for the virus, but it has not always been reported whether the swab was performed in vivo or post mortem and, when performed post mortem, when with respect to the post-mortem interval. This information could be important in understanding how long the virus remains detectable in the patient's airways after death, with implications in CSS, built to evaluate SARS CoV-2 positive patients. The lack of one or some of the CSS key points could make the score less accurate. A possible solution

could consist in the creation of a register that contains all the autopsies performed on patients affected by COVID-19, with findings organized in a systematic way.

## 6. Limitations

The present systematic review has several limits. Firstly, the time of publication chosen was quite narrow, from the early months of 2020 to 31 July 2020. However, this was necessary due to the urgency of the matter. A broader period of observation would certainly provide more relevant data. Secondly, only papers at least providing some results of a post-mortem examination were included. This was motivated by the will of obtaining stronger evidence, even though we are aware that this might have resulted in a lower number of cases. Indeed, the total number of cases herein reported is certainly low, when compared to the worldwide mortality from Covid-19. This might be due to the limitations in performing autopsies which have been established, due to the infective risk for health care personnel and forensic pathologists, in many countries. Thirdly, the comparison between the CSS and the Hamburg score was only limited to a few cases. Finally, all relevant studies were included, with no distinction on the basis of the adherence to ethical standards and of the conflicts of interest, neither selecting only high-impact journal. This was done in order to offer a broad collection of cases, though it has resulted in the inclusion of a withdrawn article. However, the corresponding paper only provided a single case; thus, statistics were only minimally affected.

## 7. Conclusions

As the pandemic continues to claim victims, it is fundamental to distinguish those patients who have died "from COVID-19" from those who have died "with COVID-19". The SARS CoV-2 Significance Score (CSS) used after a complete accurate post-mortem examination, coupled to the retrieval of in vivo data, post-mortem radiology, histology and toxicology, as well as to additional required analyses (e.g., electronic microscopy) aims to be a useful, concise tool helping in the assessment of the cause of death and the role played by this virus. A shared use of this scale might hopefully lower the inhomogeneities in forensic evaluation of SARS-CoV-2.

Acknowledgments

The authors thank Antonella Bacosi and Simonetta di Carlo for technical help.

Funding

This research received no external funding.

Data Availability Statement

Data are available from the author upon request.

Conflicts of Interest

The authors declare no conflict of interest.

References

1. WHO Director-General's Opening Remarks at the Media Briefing on COVID-19—11 March 2020. [(accessed on 9 December 2020)]; Available online: https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020.
2. Worldometer. [(accessed on 9 December 2020)]; Available online: https://www.worldometers.info/coronavirus.
3. Pfizer and BioNTech Announce Vaccine Candidate Against COVID-19 Achieved Success in First Interim Analysis from Phase 3 Study | Pfizer. [(accessed on 9 December 2020)]; Available online: https://www.pfizer.com/news/press-release/press-release-detail/pfizer-and-biontech-announce-vaccine-candidate-against.
4. Moderna's COVID-19 Vaccine Candidate Meets its Primary Efficacy Endpoint in the First Interim Analysis of the Phase 3 COVE Study | Moderna, Inc. [(accessed on 9 December 2020)]; Available online: https://investors.modernatx.com/news-releases/news-release-details/modernas-covid-19-vaccine-candidate-meets-its-primary-efficacy.
5. Grippo F., Navarra S., Orsi C., Manno V., Grande E., Crialesi R., Frova L., Marchetti S., Pappagallo M., Simeoni S., et al. The Role of COVID-19 in the Death of SARS-CoV-2–Positive Patients: A Study Based on Death Certificates. J. Clin. Med. 2020;9:3459. doi: 10.3390/jcm9113459. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
6. Slater T.A., Straw S., Drozd M., Kamalathasan S., Cowley A., Witte K.K. Dying 'due to' or 'with' COVID-19: A cause of death analysis in hospitalised patients. Clin. Med. 2020;5:189–190. doi: 10.7861/clinmed.2020-0440. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
7. Yang J., Zheng Y., Gou X., Pu K., Chen Z., Guo Q., Ji R., Wang H., Wang Y., Zhou T. Prevalence of comorbidities and its effects in coronavirus disease 2019 patients: A systematic review and meta-analysis. Int. J. Infect. 2020;94:91–95. doi: 10.1016/j.ijid.2020.03.017. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
8. Caci G., Albini A., Malerba M., Noonan D.M., Pochetti P., Polosa R. COVID-19 and Obesity: Dangerous Liaisons. J. Clin. Med. 2020;9:2511. doi: 10.3390/jcm9082511. [PMC free article]

[PubMed] [CrossRef] [Google Scholar]
9. Roncon L., Zuin M., Rigatelli G., Zuliani G. Diabetic patients with COVID-19 infection are at higher risk of ICU admission and poor short-term outcome. J. Clin. Virol. 2020:127. doi: 10.1016/j.jcv.2020.104354. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
10. Kang S.J., Jung S.I. Age-Related Morbidity and Mortality among Patients with COVID-19. Infect. Chemother. 2020;52:154–164. doi: 10.3947/ic.2020.52.2.154. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
11. Huang I., Lim M.A., Pranata R. Diabetes mellitus is associated with increased mortality and severity of disease in COVID-19 pneumonia—A systematic review, meta-analysis, and meta-regression: Diabetes and COVID-19. Diabetes Metab. Syndr. Clin. Res. Rev. 2020;14:395–403. doi: 10.1016/j.dsx.2020.04.018. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
12. Imam Z., Odish F., Gill I., O'Connor D., Armstrong J., Vanood A., Ibironke O., Hanna A., Ranski A., Halalau A. Older age and comorbidity are independent mortality predictors in a large cohort of 1305 COVID-19 patients in Michigan, United States. J. Intern. Med. 2020;288:469–476. doi: 10.1111/joim.13119. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
13. Li K., Wu J., Guo D., Chen L., Fang Z., Li C. The Clinical and Chest CT Features Associated with Severe and Critical COVID-19 Pneumonia. Invest. Radiol. 2020;55:327–331. doi: 10.1097/RLI.0000000000000672. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
14. Lluís Cirera L., Andreu Segura A., Hernández I. Defunciones por COVID-19: No están todas las que son y no son todas las que están, Gaceta Sanitaria 2020. Gac. Sanit. 2020 doi: 10.1016/j.gaceta.2020.06.006. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
15. International Guidelines for Certification and Classification (Coding) of Covid-19 as Cause of Death. Based on ICD International Statistical Classification of Diseases. [(accessed on 9 December 2020)];2020 Available online:
https://www.who.int/classifications/icd/Guidelines_Cause_of_Death_COVID-19.pdf.
16. Groenewald P., Awotiwon O., Hanmer L., Bradshaw D. Guideline for medical certification of death in the COVID-19 era. S. Afr. Med. J. 2020;110:721–723. doi: 10.7196/SAMJ.2020.v110i8.15114. [PubMed] [CrossRef] [Google Scholar]
17. Roulson J., Benbow E.W., Hasleton P.S. Discrepancies between clinical and autopsy diagnosis and the value of post mortem histology; a meta-analysis and review. Histopathology. 2005;47:551–559. doi: 10.1111/j.1365-2559.2005.02243.x. [PubMed] [CrossRef] [Google Scholar]
18. Brooks E.G., Reed K. Principles and Pitfalls: A Guide to Death Certification. Clin. Med. Res. 2015;13:74–82. doi: 10.3121/cmr.2015.1276. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
19. Gill J.R., DeJoseph M.E. The importance of Proper Death Certification During the COVID-19 Pandemic. JAMA. 2020;324:27–28. doi: 10.1001/jama.2020.9536. [PubMed] [CrossRef] [Google Scholar]
20. Shojania K., Burton E.C., McDonald M., Goldman L. Changes in Rates of Autopsy-De-

tected Diagnostic Errors over Time: A Systematic Review. JAMA. 2003;289:2849–2856. doi: 10.1001/jama.289.21.2849. [PubMed] [CrossRef] [Google Scholar]
21. Salerno M., Sessa F., Piscopo A., Montana A., Torrisi M., Patanè F., Murabito P., Li Volti G., Pomara C. No Autopsies on COVID-19 Deaths: A Missed Opportunity and the Lockdown of Science. J. Clin. Med. 2020;9:1472. doi: 10.3390/jcm9051472. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
22. Jurek T., Teresiński G. Classification criteria for the deceased referred for forensic post-mortem examinations with regard to epidemiological risk posed by SARS CoV-2/COVID-19 during the pandemic. Arch. Med. Sadowej Kryminol. 2019;69:158–163. [PubMed] [Google Scholar]
23. Tambone V., Boudreau D., Ciccozzi M., Sanders K., Campanozzi L.L., Wathuta J., Violante L., Cauda R., Petrini C., Abbate A., et al. Ethical Criteria for the Admission and Management of Patients in the ICU Under Conditions of Limited Medical Resources: A Shared International Proposal in View of the COVID-19 Pandemic. Front Public Health. 2020;8:284. doi: 10.3389/fpubh.2020.00284. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
24. Keten D., Okdemir E., Keten A. Precautions in postmortem examinations in Covid-19—Related deaths: Recommendations from Germany. J. Forensic Leg. Med. 2020;73:102000. doi: 10.1016/j.jflm.2020.102000. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
25. Mao D., Zhou N., Zheng D., Yue J., Zhao Q., Luo B., Guan D., Zhou Y., Hu B. Guide to forensic pathology practice for death cases related to coronavirus disease 2019 (COVID-19) (Trial draft) Forensic Sci. Res. 2020;5:1–7. doi: 10.1080/20961790.2020.1744400. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
26. Osborn M., Lucas S., Stewart R., Swift B., Youd E. Briefing on COVID-19 Autopsy practice relating to possible cases of COVID-19 (2019-nCov, novel coronavirus from China 2019/2020) R. Coll. Pathol. 2020;19:1–14. [Google Scholar]
27. Hanley B., Lucas S.B., Youd E., Swift B., Osborn M. Autopsy in suspected COVID-19 cases. J. Clin. Pathol. 2020;73:239–242. doi: 10.1136/jclinpath-2020-206522. [PubMed] [CrossRef] [Google Scholar]
28. Basso C., Calabrese F., Sbaraglia M., Del Vecchio C., Carretta G., Saieva A., Donato D., Flor L., Crisanti A., Dei Tos A.P. Feasibility of postmortem examination in the era of COVID-19 pandemic: The experience of a Northeast Italy University Hospital. Virchows Arch. 2020;477:341–347. doi: 10.1007/s00428-020-02861-1. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
29. Santurro A., Scopetti M., D'Errico S., Fineschi V. Response to the letter by Meng-jun Zhan et al. regarding the paper "A technical report from the Italian SARS-CoV-2 outbreak. Postmortem sampling and autopsy investigation in cases of suspected or probable COVID-19" Forensic Sci. Med. Pathol. 2020;16:746. doi: 10.1007/s12024-020-00324-2. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
30. Carpenito L., D'Ercole M., Porta F., Di Blasi E., Doi P., Redolfi Fagara G., Rey R., Bulfamante G. The autopsy at the time of SARS-CoV-2: Protocol and lessons. Ann. Diagn. Pathol. 2020;48:151562. doi: 10.1016/j.anndiagpath.2020.151562. [PMC free article] [PubMed]

[CrossRef] [Google Scholar]
31. Sessa F., Bertozzi G., Cipolloni L., Baldari B., Cantatore S., D'Errico S., Di Mizio G., Asmundo A., Castorina S., Salerno M., et al. Clinical-Forensic Autopsy Findings to Defeat COVID-19 Disease: A Literature Review. J. Clin. Med. 2020;9:2026. doi: 10.3390/jcm9072026. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
32. Kanchan T., Shrestha R., Krishan K. Post-mortem ultrasonography: A safer alternative to autopsies in COVID-19 deaths. J. Ultrasound. 2020:1–2. doi: 10.1007/s40477-020-00531-1. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
33. Monteiro R.A., Duerte Neto A.N., Da Silva L.F.F., De Oliveira E.P., Theodoro Filho J., Dos Santos G.A.B., De Oliverira I.R.S., Mauad T., Saldiva P.H.N., Dolhnikoff M. Ultrasound-guided minimally invasive autopsies: A protocol for the study of pulmonary and systemic involvement of COVID-19. Clinics. 2020;75:1–2. doi: 10.6061/clinics/2020/e1972. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
34. Giorgetti A., Giorgetti R. Hic est locus ubi mors gaudet succurrere vitae. BMJ J. Clin. Pathol. 2020;73:5. [Google Scholar]
35. Elliott S., Sedefov R., Evans-Brown M. Assessing the toxicological significance of new psychoactive substances in fatalities. Drug Test Anal. 2018;10:120–126. doi: 10.1002/dta.2225. [PubMed] [CrossRef] [Google Scholar]
36. Giorgetti A., Busardò F.P., Tittarelli R., Auwärter V., Giorgetti R. Post-Mortem Toxicology: A Systematic Review of Death Cases Involving Synthetic Cannabinoid Receptor Agonists. Front Psychiatry. 2020;11:464. doi: 10.3389/fpsyt.2020.00464. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
37. Buschmann C., Tsokos M. Corona-associated suicide—Observations made in the autopsy room. Leg. Med. 2020;46:101723. doi: 10.1016/j.legalmed.2020.101723. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
38. Edler C., Schroder A.S., Aepfelbacher M., Fitzek A., Heinemann A., Heinrich F., Klein A., Klein A., Langenwalder F., Lutgehetmann M., et al. Dying with SARS-CoV-2 infection—An autopsy study of the first consecutive 80 cases in Hamburg, Germany. Int. J. Legal Med. 2020;134:1275–1284. doi: 10.1007/s00414-020-02317-w. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
39. Bradley B.T., Maioli H., Johnston R., Chaudhry I., Fink S.L., Xu H., Najafian B., Deutsch G., Lacy J.M., Williams T., et al. Histopathology and ultrastructural findings of fatal COVID-19 infections in Washington State: A case series. Lancet. 2020;396:320–332. doi: 10.1016/S0140-6736(20)31305-2. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
40. Wichmann D., Sperhake J.P., Lutgehetmann M., Steurer S., Edler C., Heinemann A., Heinrich F., Mushumba H., Hniep I., Schroder A.S., et al. Autopsy Findings and Venous Thromboembolism in Patients With COVID-19: A Prospective Cohort Study. Ann. Intern. Med. 2020;173:268–277. doi: 10.7326/M20-2003. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
41. Schaefer I.M., Padera R.F., Solomon I.H., Kanjilal S., Hammer M.M., Hornick J.H., Sholl L.M. In situ detection of SARS-CoV-2 in lungs and airways of patients with COVID-19. Mod.

Pathol. 2020;33:2104–2114. doi: 10.1038/s41379-020-0595-z. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
42. Beigmohammadi M.T., Jahanbin B., Safaei M., Amoozadeh L., Khoshavi M., Mehrtash V., Jafarzadeh B., Abdollahi A. Pathological Findings of Postmortem Biopsies from Lung, Heart, and Liver of 7 Deceased COVID-19 Patients. Int. J. Surg. Pathol. 2020 doi: 10.1177/1066896920935195. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
43. Tian S., Xiong Y., Liu H., Niu L., Guo J., Liao M., Xiao S.Y. Pathological study of the 2019 novel coronavirus disease (COVID-19) through postmortem core biopsies. Mod. Pathol. 2020;33:1007–1014. doi: 10.1038/s41379-020-0536-x. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
44. Varga Z., Flammer A.J., Steiger P., Haberecker M., Andermatt R., Zinkernagel A.S., Mehra M.R., Schuepbach R.A., Ruschitzka F., Moch H., et al. Endothelial cell infection and endotheliitis in COVID-19. Lancet. 2020;395:1417–1418. doi: 10.1016/S0140-6736(20)30937-5. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
45. Prilutskiy A., Kritselis M., Shevtsov A., Yambayev I., Vadlamudi C., Zhao Q., Kataria Y., Sarosiek S.R., Lerner A., Sloan J.M., et al. SARS-CoV-2 Infection–Associated Hemophagocytic Lymphohistiocytosis. Am. J. Clin. Pathol. 2020;154:466–474. doi: 10.1093/ajcp/aqaa124. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
46. Bösmüller H., Traxler S., Bitzer M., Haberle H., Raiser W., Nann D., Frauendeld L., Vogelsberg A., Klingel K., Fend F. The evolution of pulmonary pathology in fatal COVID-19 disease: An autopsy study with clinical correlation. Virchows Arch. 2020;477:349–357. doi: 10.1007/s00428-020-02881-x. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
47. Buja L., Wolf D.A., Zhao B., Akkanti B., McDonald M., Lelenwa L., Reilly N., Ottaviani G., Elgheyany M.T., Ocazionez Trujillo D., et al. The emerging spectrum of cardiopulmonary pathology of the coronavirus disease 2019 (COVID-19): Report of 3 autopsies from Houston, Texas, and review of autopsy findings from other United States cities. Cardiovasc. Pathol. 2020;48:107233. doi: 10.1016/j.carpath.2020.107233. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
48. Youd E., Moore L. COVID-19 autopsy in people who died in community settings: The first series. J. Clin. Pathol. 2020;73:840–844. doi: 10.1136/jclinpath-2020-206710. [PubMed] [CrossRef] [Google Scholar]
49. Barton L.M., Duval E.J., Stroberg E., Ghosh S., Mukhopadhyay S. COVID-19 Autopsies, Oklahoma, USA. Am. J. Clin. Pathol. 2020;153:725–733. doi: 10.1093/ajcp/aqaa062. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
50. Sekulic M., Harper H., Nezami B.G., Shen D.L., Pichler Sekulic S., Koeth A.T., Harding C.V., Gilmore H., Sadri N. Molecular detection of SARS-CoV-2 infection in FFPE samples and histopathologic findings in fatal SARS-CoV-2 cases. Am. J. Clin. Pathol. 2020;154:190–200. doi: 10.1093/ajcp/aqaa091. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
51. Wang C., Xie J., Zhao L., Fei X., Zhang H., Tan Y., Nie X., Zhou L., Liu Z., Ren Z. Alveolar macrophage dysfunction and cytokine storm in the pathogenesis of two severe COVID-19 patients. EBioMedicine. 2020;57:102833. doi: 10.1016/j.ebiom.2020.102833. [PMC free ar-

ticle] [PubMed] [CrossRef] [Google Scholar]
52. Grimes Z., Bryce C., Sordillo E.M., Gordon R.E., Reidy J., Painz Mandolfi A.E., Fowkes M. Fatal Pulmonary Thromboembolism in SARS-CoV-2-Infection. Cardiovasc. Pathol. 2020;48:107227. doi: 10.1016/j.carpath.2020.107227. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
53. Konopka K.E., Wilson A., Myers J.L. Postmortem Lung Findings in an Asthmatic Patient with Coronavirus Disease 2019. Chest. 2020;158:99–101. doi: 10.1016/j.chest.2020.04.032. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
54. Craver R., Huber S., Sandomirskky M., McKenna D., Schieffelin J., Finger L. Fatal Eosinophilic Myocarditis in a Healthy 17-Year-Old Male with Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2c) Fetal Pediatr. Pathol. 2020;39:263–268. doi: 10.1080/15513815.2020.1761491. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
55. The COVID-19 Autopsy The first COVID-19 autopsy in Spain performed during the early stages of the pandemic. Rev. Esp. Patol. 2020;53:182–187. [PMC free article] [PubMed] [Google Scholar]
56. Navarro Conde P., Monraval P.A., Medina C.M., Sanchez A.J., Teruel J.C.A., Marco J.F., Puglia Santos V., Aranda E.M. Autopsy findings from the first known death from Severe Acute Respiratory Syndrome SARS-CoV-2 in Spain. Rev. Esp. Patol. 2020;53:188–192. doi: 10.1016/j.patol.2020.04.002. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
57. Heinrich F., Sperhake J.P., Heinemann A., Mushumba H., Lennartz M., Norz D., Glatzel M., Lutgehetmann M., Puschel K. Germany's first COVID-19 deceased: A 59-year-old man presenting with diffuse alveolar damage due to SARS-CoV-2 infection. Virchows Arch. 2020;477:335–339. doi: 10.1007/s00428-020-02872-y. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
58. Xu Z., Shi L., Wang Y., Zhang J., Huang L., Zhang C., Liu S., Zhao P., Liu H., Zhu L., et al. Pathological findings of COVID-19 associated with acute respiratory distress syndrome. Lancet Respir. Med. 2020;8:420–422. doi: 10.1016/S2213-2600(20)30076-X. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
59. Lovly C., Boyd K.L., Gonzalez Ericsson P.I., Lowe C.L., Brown H.M., Hoffman R.D., Sterling B.C., Kapp M.E., Johnson D.B., Kopparapu P.R., et al. Rapidly fatal pneumonitis from immunotherapy and concurrent SARS-CoV-2 infection in a patient with newly diagnosed lung cancer. medRxiv. 2020 doi: 10.1101/2020.04.29.20085738. [CrossRef] [Google Scholar]
60. Adachi T., Chong J.M., Nakajima N., Sano M., Yamazaki J., Miyamoto I., Nishioka H., Akita H., Sato Y., Kataoka M., et al. Clinicopathologic and immunohistochemical findings from autopsy of patient with COVID-19, Japan. Emerg. Infect. Dis. 2020;26:2157–2161. doi: 10.3201/eid2609.201353. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
61. Yan L., Mir M., Sanchez P., Beg M., Peters J., Enriquez O., Gilbert A. COVID-19 in a hispanic woman: Autopsy report with clinical-pathologic correlation. Arch. Pathol. Lab. Med. 2020;144:1041–1047. doi: 10.5858/arpa.2020-0217-SA. [PubMed] [CrossRef] [Google Scholar]

62. Lacy J.M., Brooks E.G., Akers J., Armstrong D., Decker L., Gonzalez A., Humphrey W., Mayer R., Miller M., Perez C., et al. COVID-19: Postmortem diagnostic and biosafety considerations. Am. J. Forensic Med. 2020;41:143–151. doi: 10.1097/PAF.0000000000000567. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
63. Farkash E.A., Wilson A.M., Jentzen J.M. Ultrastructural evidence for direct renal infection with sars-cov-2. J. Am. Soc. Nephrol. 2020;31:1683–1687. doi: 10.1681/ASN.2020040432. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
64. Aguiar D., Lobrinus J.A., Schibler M., Fracasso T., Lardi C. Inside the lungs of COVID-19 disease. Int. J. Legal Med. 2020;134:1271–1274. doi: 10.1007/s00414-020-02318-9. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
65. Karami P., Naghavi M., Feyzi A., Aghamohammadi M., Novin M.S., Mobaien A., Norooznezhad A.H. Mortality of a pregnant patient diagnosed with COVID-19: A case report with clinical, radiological, and histopathological findings. Travel Med. Infect. Dis. 2020 doi: 10.1016/j.tmaid.2020.101665. [CrossRef] [Google Scholar]
66. Suess C., Hausmann R. Gross and histopathological pulmonary findings in a COVID-19 associated death during self-isolation. Int. J. Legal Med. 2020;134:1285–1290. doi: 10.1007/s00414-020-02319-8. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
67. Santana M.F., Pivoto G., Araujo Alexandre M.A., Baia da Silva D.C., Da Silva Borba M.G., Almeida Val F., Brito Sousa J.D., Cardoso Melo G., Monteiro W.M., Barga Souza J.V., et al. Confirmed invasive pulmonary aspergillosis and COVID-19: The value of postmortem findings to support antemortem management. Rev. Soc. Bras. Med. Trop. 2020;53:1–4. doi: 10.1590/0037-8682-0401-2020. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
68. Stone J.R., Tran K.M., Conklin J., Mino Kenudson M. Case 23-2020: A 76-Year-Old Woman Who Died from Covid-19. N. Engl. J. Med. 2020;383:380–387. doi: 10.1056/NEJMcpc2004974. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
69. Barranco R., Ventura F. The role of forensic pathologists in coronavirus disease 2019 infection: The importance of an interdisciplinary research. Med. Sci. Law. 2020;60:237–238. doi: 10.1177/0025802420927825. [PubMed] [CrossRef] [Google Scholar]
70. Ventura F., Barranco R. Cadaveric Nasopharyngeal Swab in Coronavirus Disease 2019 Infections: Can it be Useful for Medico-Legal Purposes? Am. J. Forensic Med. Pathol. 2020;41:238–239. doi: 10.1097/PAF.0000000000000560. [PubMed] [CrossRef] [Google Scholar]
71. Dell'Aquila M., Cattani P., Fantoni M., Marchetti S., Aquila I., Stigliano E., Carbone A., Oliva A., Arena V. Postmortem Swabs in the Severe Acute Respiratory Syndrome Coronavirus 2 Pandemic: Report on 12 Complete Clinical Autopsy Cases. Arch. Pathol. Lab. Med. 2020;144:1298–1302. doi: 10.5858/arpa.2020-0362-SA. [PubMed] [CrossRef] [Google Scholar]
72. Dijkhuizen L.G.M., Gelderman H.T., Duijst W.L.J.M. Review: The safe handling of a corpse (suspected) with COVID-19. J. Forensic Leg. Med. 2020;73:101999. doi: 10.1016/j.jflm.2020.101999. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
73. Skok K., Stelzl E., Trauner M., Kessler H.H., Lax S.F. Post-mortem viral dynamics and tro-

pism in COVID-19 patients in correlation with organ damage. Virchows Arch. 2020:1–11. doi: 10.1007/s00428-020-02903-8. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
74. Seetulsingh P., Kannangara C.I., Richman P. Undetectable SARS-CoV-2 in a nasopharyngeal swab but persistent viral RNA from deep lung swabs: Findings from an autopsy. BMJ Case Rep. 2020;13:e237446. doi: 10.1136/bcr-2020-237446. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
75. Italian Ministry of Health Emergency Indications Related to the COVID-19 Epidemic Concerning the Funeral Sector, Cemetery, and Cremation—Update Following the New Legislative Indications and Epidemiological Data. Circular of General Direction of Health Prevention. [(accessed on 13 January 2021)];2020 Available online: https://opi.roma.it/archivio_news/news/1949/5740%20Aggiornamento%20Circolare%20serv%20funebri%2028_5_2020.pdf.
76. Infection Prevention and Control for the Safe Management of a Dead Body in the Context of COVID-19. [(accessed on 13 January 2021)]; Available online: https://apps.who.int/iris/
bitstream/handle/10665/331538/WHO-COVID-19-IPC_DBMgmt-2020.1-eng.pdf.
77. Centers for Disease Control and Prevention Healthcare workers. Postmortem Guidance. [(accessed on 13 January 2021)]; Available online: https://www.cdc.gov/coronavirus/2019-ncov/hcp/guidance-postmortem-specimens.html#biosafety.
78. Prieto-Pérez L., Fortes J., Soto C., Vidal Gonzalez A., Alonso Riano M., Lafarga M., Cortti M.J., Lazaro Garcia A., Perez Tanoira R., Trascasa A., et al. Histiocytic hyperplasia with hemophagocytosis and acute alveolar damage in COVID-19 infection. Mod. Pathol. 2020;33:2139–2146. doi: 10.1038/s41379-020-0613-1. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
79. Menter T., Haslbauer J.D., Nienhold R., Savic S., Hopfer H., Deigendesch N., Frank S., Turek D., Willi N., Pargger H., et al. Postmortem examination of COVID-19 patients reveals diffuse alveolar damage with severe capillary congestion and variegated findings in lungs and other organs suggesting vascular dysfunction. Histopathology. 2020;77:198–209. doi: 10.1111/his.14134. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
80. Fox S., Akmatbekov A., Harbert J., Li G., Brown J.Q., Vander Heide R.S. Pulmonary and Cardiac Pathology in African American patients with Covid-19: An autopsy series from New Orleans. Lancet Respir. Med. 2020;8:681–689. doi: 10.1016/S2213-2600(20)30243-5. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
81. Duarte Neto A.N., Monteiro R.A.A., Da Silva L.F.F., Malheiros D.M.A.C., De Oliveira E.P., Theodoro Filho J., Pinho J.R.R., Gomes Gouvea M.S., Salles A.P.M., De Oliveira I.R.S., et al. Pulmonary and systemic involvement in COVID-19 patients assessed with ultrasound-guided minimally invasive autopsy. Histopathology. 2020;77:186–197. doi: 10.1111/his.14160. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
82. Carsana L., Sonzogni A., Nasr A., Rossi R.S., Pellegrinelli A., Zerbi P., Rech R., Colombo R., Antinori S., Corbellino M., et al. Pulmonary post-mortem findings in a series of

COVID-19 cases from northern Italy: A two-centre descriptive study. Lancet Infect. Dis. 2020;20:1135–1140. doi: 10.1016/S1473-3099(20)30434-5. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
83. Ackermann M., Verleden S.E., Kuehnel M., Haverich A., Welte T., Lenger F., Vanstapel A., Werlein C., Stark H., Tzankov A., et al. Pulmonary Vascular Endothelialitis, Thrombosis, and Angiogenesis in Covid-19. N. Engl. J. Med. 2020;383:120–128. doi: 10.1056/NEJMoa2015432. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
84. Golmai P., Larsen C.P., DeVita M.V., Wahl S.J., Weins A., Rennkeet H.G., Bijol V., Rosenstock J.L. Histopathologic and Ultrastructural Findings in Postmortem Kidney Biopsy Material in 12 Patients with AKI and COVID-19. J. Am. Soc. Nephrol. 2020;31:1944–1947. doi: 10.1681/ASN.2020050683. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
85. Sonzogni A., Previtali G., Seghezzi M., Alessio M.G., Gianatti A., Licini L., Morotti D., Zerbi P., Carsana L., Rossi R., et al. Liver histopathology in severe COVID 19 respiratory failure is suggestive of vascular alterations. Liver Int. 2020;40:2110–2116. doi: 10.1111/liv.14601. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
86. Su H., Yang M., Wan C., Yi L.X., Tang F., Zhu H.Y., Yi F., Yang H.C., Fogo B.A., Nie X., et al. Renal histopathological analysis of 26 postmortem findings of patients with COVID-19 in China. Kidney Int. 2020;98:219–227. doi: 10.1016/j.kint.2020.04.003. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
87. Pesaresi M., Pirani F., Tagliabracci A., Valsecchi M., Procopio A.D., Busardò F.P., Graciotti L. SARS-CoV-2 identification in lungs, heart and kidney specimens by transmission and scanning electron microscopy. Eur. Rev. Med. Pharmacol. Sci. 2020;24:5186–5188. [PubMed] [Google Scholar]
88. Brinkmann B. Harmonization of medico-legal autopsy rules. Council of Europe. Int. J. Legal Med. 1999;113:1–14. doi: 10.1007/s004140050271. [PubMed] [CrossRef] [Google Scholar]
89. European Council of Legal Medicine Harmonization of Medico-Legal Autopsy Rules. [(accessed on 13 January 2021)]; Available online: http://development.fullscreen.pt/eclm/client/files/0000000001/eclmharmonisationofautopsyrules2014_70.pdf.
90. Elezkurtaj S., Greuel S., Ihlow J., Michaelis E., Bischoff P., Kunze C.A., Sinn B.V., Gerhold M., Hauptmann K., Ingold Heppner B., et al. Causes of Death and Comorbidities in Patients with COVID-19. MedRxiv. 2020 doi: 10.1101/2020.06.15.20131540. [CrossRef] [Google Scholar]
91. Knight S.R., Ho A., Pius R., Buchan I., Carson G., Drake T.M., Dunning J., Fairfield C.J., Gamble C., Green C.A., et al. Risk stratification of patients admitted to hospital with covid-19 using the ISARIC WHO Clinical Characterisation Protocol: Development and validation of the 4C Mortality Score. BMJ. 2020 doi: 10.1136/bmj.m3339. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
92. Bartoletti M., Giannella M., Scudeller L., Tedeschi S., Rinaldi M., Bussini L., Fornaro G., Pascale R., Pancaldi L., Pasquini Z., et al. PREDICO study group. Development and validation of a prediction model for severe respiratory failure in hospitalized patients with

SARS-CoV-2 infection: A multicentre cohort study (PREDI-CO study) Clin. Microbiol. Infect. 2020;26:1545–1553. doi: 10.1016/j.cmi.2020.08.003. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
93. Chao H., Fang X., Zhang J., Homayounieh F., Arru C.D., Digumarthy S.R., Babaei R., Mobin H.K., Mohseni I., Saba L., et al. Integrative analysis for COVID-19 patient outcome prediction. Med. Image. Anal. 2021;67:101844. doi: 10.1016/j.media.2020.101844. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

---

Open Forum Infectious Diseases • February 2nd, 2021

# Bacterial Superinfections Among Persons With Coronavirus Disease 2019: A Comprehensive Review of Data From Postmortem Studies

By Cornelius J. Clancy,1 Ilan S. Schwartz,2 Brittany Kula,2 and M. Hong Nguyen1

1. Division of Infectious Diseases, Department of Medicine
University of Pittsburgh, Pittsburgh, Pennsylvania, USA, and
2. Division of Infectious Diseases, Department of Medicine
Faculty of Medicine and Dentistry, University of Alberta
Edmonton, Alberta, Canada

## Background

Limited clinical data suggest a ~16% prevalence of bacterial superinfections among critically ill patients with coronavirus disease 2019 (COVID-19).

## Methods

We reviewed postmortem studies of patients with COVID-19 published in English through September 26, 2020, for histopathologic findings consistent with bacterial lung infections.

## Results

Worldwide, 621 patients from 75 studies were included. The quality of data was uneven, likely because identifying superinfections was not a major objective in 96% (72/75) of studies. Histopathology consistent with a potential lung superinfection was reported in 32% (200/621) of patients (22–96 years old; 66% men). Types of infections were pneumonia (95%), abscesses or empyema (3.5%), and septic emboli (1.5%). Seventy-three percent of pneumonias were focal rather than diffuse. The predominant histopathologic findings were intra-alveolar neutrophilic infiltrations that were distinct from those typical of COVID-19-associated diffuse alveolar damage. In studies with available data, 79% of patients received antimicrobial treatment; the most common agents were beta-lactam/beta-lactamase inhibitors (48%), macrolides (16%), cephalosoprins (12%), and carbapenems (6%).

Superinfections were proven by direct visualization or recovery of bacteria in 25.5% (51/200) of potential cases and 8% of all patients in postmortem studies. In rank order, pathogens included Acinetobacter baumannii, Staphylococcus aureus, Pseudomonas aeruginosa, and Klebsiella pneumoniae. Lung superinfections were the cause of death in 16% of potential cases and 3% of all patients with COVID-19.

## Conclusions

Potential bacterial lung superinfections were evident at postmortem examination in 32% of persons who died with COVID-19 (proven, 8%; possible, 24%), but they were uncommonly the cause of death. Postmortem histopathology data indicate that bacterial lung superinfections complicated a minority of COVID-19 cases globally over the first months of the pandemic, and they were uncommonly the cause of death.

It is plausible that the features and impact of superinfections will change as the pandemic progresses, particularly as mortality rates have declined in hospitalized patients and as the roles of corticosteroids and other immunomodulatory drugs evolve [89]. Antimicrobial stewardship will continue to be a priority, as antibacterial use in SARS-CoV-2-infected patients is likely to remain in excess of superinfections [1, 83].

It is imperative that centers collect and publish their clinical, microbiology, antimicrobial prescribing, and AMR data, using rigorous, systematic testing strategies and clearly stated case definitions. There is a pressing need for well-designed prospective studies, particularly as COVID-19 treatment paradigms shift.

The failure of many postmortem studies to discuss or seriously investigate superinfec-

tions is a major missed opportunity. In future studies, greater attention should be paid to identifying potential bacterial infections, including those of organs other than the lungs, and to coupling histopathologic findings with clinical data.

Other priorities are to identify risk factors for superinfections, including those specific to SARS-CoV-2 infection, define relationships between timelines of superinfections and corresponding microbiology and AMR patterns, and understand the accuracy of antemortem diagnoses of pneumonia and their impact on antimicrobial usage and patient outcomes.

"Just Say No To Drugs"

~Nancy Reagan, wife of the 40th
President of the United States, Ronald Reagan

# CHAPTER THREE

## THE STORIES

1. How did the scam unfold? The Scenarios.
2. What was done to 'dupe' the world?
3. Who's behind the first Global Bioweapon Attack on humanity?

# The 2019 SARS CoV-2 Scamdemic • Part 1

by Jeff Prager

Free Download:
https://www.academia.edu/45033876/Scamdemic_Fraud_At_The_Highest_Levels_Of_Governance

# The 2019 SARS CoV-2 Scamdemic • Part 2

by Jeff Prager

Needless to say, all of the mainstream media numbers are, due to purposeful government and industry obfuscation, completely unreliable. However, thanks to various citizens groups, national and international attorneys, research and practicing doctors and FOIA requests we now know the truth behind SARS CoV-2, it's introduction to the world, the complete malfeasance by United States physicians who failed their oaths to do no harm by refusing to treat patients with symptoms of SARS CoV-2. instead sending them home to turn blue, have difficulty breathing and overload the hospitals when safe and effective treatments are available that reduce hospitalization and death by 85%..

That's correct. Not one institutionally affiliated medical doctor in the USA offered EARLY CoV-2 treatment and there are numerous safe and effective treatments that far outweigh the risks of a rushed to market, fully untested, experimental genetically altering injection that we currently have no short- or long-term data on.

The test, the Phase 4 Trial referenced in the manufacturers peer review but never uttered on mainstream Tell-A-Vision—Phase 4 Trial—is currently underway and everyone that's been injected is participating largely unknowingly in the largest clinical experiment in world history. The trial will end sometime in late 2022 or early 2023.

During the most recent Pandemic, the H1N1 bird flu Pandemic we ended the vaccination program after 25 deaths were reported to the VAERS database.

During the previous Pandemic we ended the vaccination program after 58 deaths were reported to the VAERS database.

During the current SARS CoV-2 alleged Pandemic we've experienced, if I include the European Union and the UK, over 15,000 deaths (5,000 approx. in the USA and 10,000 approx. in the European Union and the UK).

We've experienced 1000s of cases of Myocarditis across the globe, over 800 just in the United States. We're told most of these incidents are recoverable and short-lived but this is a lie. Myocarditis is an indication of the death of heart muscle cells.

The heart is the only muscle in the body that cannot reproduce dead cells and with Myocarditis we have absolutely no way of knowing which and how many cells died during the acute phase. Patients are monitored closely, often require 8 to 10 different medications for months, are restricted to highly limited activity and many will die early from heart prob-

lems related directly to the Pfizer, Moderna and AstraZeneca injections. Never in human history has such a monstrous crime againt humanity been committed and it's up to us, you and me, to see that this horror show never occurs again. Get active, or we lose the game.

# The SPARS Pandemic 2025–2028

## A Futuristic Scenario To Facilitate Medical Countermeasure Communication

JOURNAL OF INTERNATIONAL CRISIS AND RISK COMMUNICATION RESEARCH
2020, VOL 3, NO 1, 71–102 https://doi.org/10.30658/jicrcr.3.1.4

MARCH 5th 2020

CONTACTS Monica Schoch-Spana, PhD • E-mail: mschoch@jhu.edu • Johns Hopkins Center for Health Security, 621 East Pratt Street, Suite 210, Baltimore, MD 21202 and Nicholson School of Communication and Media University of Central Florida www.jicrcr.com

Emily K. Brunson1 , Hannah Chandler2 , Gigi Kwik Gronvall3 , Sanjana Ravi3 , Tara Kirk Sell3 , Matthew P. Shearer3 , and Monica Schoch-Spana3

1. Department of Anthropology, Texas State University, San Marcos, Texas, USA
2. Columbia University Mailman School of Public Health, New York, New York, USA
3. Johns Hopkins Center for Health Security and Department of Environmental Health and Engineering, Johns Hopkins Bloomberg School of Public Health Baltimore, Maryland, USA

ABSTRACT

Effective communication about medical countermeasures—including drugs, devices, and biologics—is often critical in emergency situations. Such communication, how- ever, does not just happen. It must be planned and prepared for. One mechanism to develop communication strategies is through the use of prospective scenarios, which allow readers the opportunity to rehearse responses while also weighing the implications of their actions. This article describes the development of such a scenario: The SPARS Pandemic 2025–2028. Steps in this process included deciding on a time frame, identifying likely critical uncertainties, and then using this framework to construct a storyline covering both the response and recovery phases of a fictional emergency event. Lessons learned from the scenario development and how the scenario can be used to improve communication are also discussed.

Medical countermeasures (MCM)—including drugs, devices, and biologics (e.g., vaccines)—often play critical roles in curtailing the impacts of natural disease outbreaks as well as chemical, biological, radiological, or nuclear (CBRN) incidents (Courtney & Sadove, 2015). It is not uncommon for members of the public, however, to misuse or hesitate to take recommended MCM (Liu et al., 2017; Quinn et al., 2008; Steelfisher et al., 2011). New and unfamiliar technology, an accelerated regulatory approval process, or discordant expert views may heighten perceived risks of MCM, leading to public aversion to the countermeasure and/or diminished public trust in MCM regulators or recommenders (Belongia et al., 2005; Carlsen & Glenton, 2016; Henrich & Holmes, 2011). In other cases, strong feelings of vulnerability in an emergency situation may prompt persons to demand unnecessary MCM, protest their lack of access to MCM with limited availability, and/or use an excessive amount of prescribed MCM (Dart et al., 2015; Durigon & Kosatsky, 2012; Whitcomb et al., 2015). In still other situations, certain social groups may have limited access to MCM because some institutions are still in the process of learning how culture, race, language, and citizenship status produce barriers to health information sharing (Lin et al., 2014; Uscher-Pines et al., 2011). To mitigate all of these issues and ensure proper and timely use of MCM, good communication is key.

From 2014 to 2016, the Center for Health Security undertook a research project to catalog MCM communication "dilemmas" (in the broad sense of a problem) in emergency situations and provide practical and strategic recommendations on how better to obtain desired population health outcomes through improved communication. The principal product was a casebook featuring recent health crises (e.g., 2014–2015 West Africa Ebola outbreak and 2011 Fukushima nuclear plant accident) that helped to illustrate the principles and conditions for effective MCM communication (Schoch-Spana et al., 2016).

Much of the practice-oriented literature relies upon real crises to illustrate successful (or failed) approaches to risk and crisis communication (e.g., Centers for Disease Control and Preven- tion [CDC], 2018; Ulmer et al., 2017). The project team similarly used past health emergencies to advance understanding of how communication enables appropriate public use of MCMs, because case studies have compelling benefits for learning: People reason effectively through analogy and not just abstract principles, contextualization makes broader principles meaningful and memorable, and cases promote reflective thinking and reinforce users' abilities to apply that knowledge in novel settings (Allchin, 2013; Epling et al., 2003).

Leveraging the same didactic qualities as retrospective cases (Varum & Melo, 2010), the project team subsequently developed a fictionalized prospective scenario—The SPARS Pandemic 2025-2028—to further prepare users for MCM-related risk and crisis communication dilemmas on the horizon. A scenario is an "analytically coherent" and "imaginatively engaging" story about a possible future state (Bishop et al., 2007) that spurs users

to envision and exercise their role in shaping potential outcomes (Borjeson et al., 2006; Mahmoud et al., 2009; Wilkinson & Eidinow, 2008). Outlined in this paper and available in full online (Schoch-Spana et al., 2017), the SPARS scenario is intended to help authorities better anticipate MCM emergency communication dilemmas, understand the larger contexts, practice effective responses, and develop acuity and agility for addressing unforeseen problems. The SPARS Pandemic 2025–2028 features MCM communication dilemmas both of the enduring and emerging kind—especially those in relation to evolving information and communication technologies (ICT).

## Benefits of Scenarios and Simulations in Preparing for Disasters and Epidemics

The forward-looking SPARS scenario is a tool meant to prompt readers to imagine the dynamic and oftentimes conflicted circumstances in which MCM emergency communication takes place. By engaging readers with a rigorous, simulated health emergency the scenario provides opportunities for readers to mentally "rehearse" responses while also weighing the implications of their actions (Borjeson et al., 2006). Apart from testing out responses to foreseeable events, the scenario also provides readers opportunities to consider potential measures in today's environment that might avert comparable problems or classes of problems in the future; that is, consider how to create a preferred future (Bishop et al., 2007; Borjeson et al., 2006; Mahmoud et al., 2009; Wilkinson & Eidinow, 2008).

Producing coherent and imaginative narratives about the future to inform decision-making in the present is an approach to planning and risk management that businesses, think tanks, gov- ernments, and non-governmental organizations have embraced for a half century or more, and a wide range of aims, applications, and techniques have evolved (Bishop et al., 2007; Varum & Melo, 2010; Wilkinson & Eidinow, 2008). In the case of a low-probability high-consequence event like a pandemic or CBRN incident in which MCM may be deployed, scenario development provides a way—absent an actual emergency—for stakeholders to characterize specific impacts (based on the accepted science), create a shared vision of the threat, weigh alternatives futures with or without risk-reducing interventions, and stimulate action (Earthquake Engineering Research Institute [EERI], 2019; Preuss & God- frey, 2006). Earthquake and bioterrorism scenarios, for instance, have played important roles in motivating creative thinking about the need for novel policies and programs and in mobilizing new constituencies around seismic risk reduction (National Research Council [NRC], 2011) and public health emergency preparedness (Hamilton & Smith, 2006; O'Toole et al., 2002), respectively.

Scenarios that depict an unfolding crisis are valuable tools that can heighten awareness about complex hazards and also enable practical training for the management of disasters and epidemics through exercises (European Centre for Disease Prevention and Control [ECDC], 2014; Federal Emergency Management Agency [FEMA], 2019; World Health Orga-

nization [WHO], 2018). Discussion-based exercises (often called tabletop exercises) help participants, typically decision-makers, become more familiar with emergency plans and procedures, individual and organizational roles and responsibilities, and special challenges posed by a particular threat to public health and safety. By contrast, operation-based exercises (such as drills, functional exercises, and field exercises) attempt to incorporate, to a lesser or greater degree, the front-line personnel, equipment, and physical spaces expected to be in play during an actual emergency (FEMA, 2019; Skryabina et al., 2017). A majority of studies on the effectiveness of training in emergency risk communication, in particular, conclude that the impacts of tabletop exercises and simulation for training include enhanced awareness, readiness, and knowledge (Miller et al., 2017).

## Social Media Challenges/Opportunities for Health and MCM Communication

Like the previously mentioned earthquake and bioterrorism scenarios, the SPARS scenario is meant to prepare risk and crisis communicators for future emergencies, and in particular the complex conditions that rapidly-evolving ICT, including social media, are now generating around medicine/public health generally and MCM specifically.

ICT use, including text, illustrations, photo, audio, videos, and diagrams communicated through blog posts, instant messages, video chats, and social network platforms, is now widespread and often used for health-related activities. Among members of the public, a 2010 survey by the Pew Research Center, for instance, showed that 8 in 10 internet users look online for health information, making it the third most popular online activity in the U.S. (Fox, 2011). Likewise, practitioners, public health officials, and other health experts are increasingly turning to ICT—which provides a means to reach the broadest possible population in the fastest, easiest, and least expensive manner (Hinton & Hjorth, 2013)—for a variety of purposes. Clinician-to-patient and peer-to-peer communication, investing individual patients in their own care, information exchanges among diverse healthcare and public health stakeholders, and detecting and managing disease out-breaks have been transformed through ITC (Charles-Smith et al., 2015; Grajales et al., 2014; Kreps & Neuhauser, 2010; Rice & Sara, 2018). While this situation may appear overwhelmingly positive, some aspects of ITC use and its popularity remain problematic.

First, ITC use has altered the dynamics between health experts and the patients and populations they serve (Hawn, 2009). Social media in particular has provided a mechanism for laypersons to readily share their health-related experiential knowledge with each other, thus dislodging the centrality of health professionals' authoritative knowledge in people's decision-making and behavior (Hawn, 2009; Househ et al., 2014).

Second, ITC can, and is, used to spread false information. Wolfe and associates (2002), for example, found that 32% of antivaccine websites surveyed included pictures of "menac-

ing needles" and 23% had pictures of children reported to have been harmed or killed by vaccines. As parents come across these images and their associated stories this can lead parents to place greater emphasis on personal and emotional experience rather than scientific evidence. Referred to as false consensus bias in the social psychology literature, parents may then hesitate to vaccinate or reject vaccines for their children altogether.

What is particularly challenging in regard to social media is that such images and negative stories tend to have a greater impact than facts and positive messages. In their research of vaccination-related YouTube videos, for example, Keelan and associates (2007) found that while the majority (48%) of the 153 identified videos promoted vaccination and only 32% were negative toward vaccination, the most liked and viewed were the ones with negative content. The lowest rated and watched videos were pro-vaccination public service announcements.

These positive and negative aspects of ITC, in turn, influence what practitioners and the broader public understand about MCM safety and efficacy, thus presenting new challenges and opportunities for crisis and risk communicators. Medication users, for example, are increasingly sharing personal knowledge and experience of drug benefits and risks via online disease support networks, patient and drug forums, and microblogging (Matsuda, 2017; Sloane et al., 2015). Through social media, these individuals can find both practical information and a sense of community, while drug safety professionals have a new, rich data source with which to mine for potential evidence of adverse events, supplementing uneven healthcare provider reports (Edwards & Lindquist, 2011; Inch et al., 2012).

At the same time, great potential exists for the public to encounter misleading or dangerous information about pharmaceuticals, as non-expert consumers deliver their own drug product testimonials and illegal online pharmacies promote their services via social media (Tyrawski & DeAndrea, 2015). Misinformation is proving especially challenging in connection with vaccines where social media users encounter disproportionate negative reporting and images, are more swayed by personal narratives about vaccination's adverse effects than the science, and tend to judge disparate ideas about vaccines as equally valid, regardless of expertise (Guidry et al., 2015; Kata, 2012; Poland et al., 2009; Witteman & Zikmund-Fisher, 2012). Thus, in this current ITC-rich environment, good communication, and good training for effective communication, is critical.

## Methods

To develop the SPARS scenario a project team with expertise in a variety of areas, including epidemiology, public health preparedness, risk communication, and the biological and social sciences, was assembled. Utilizing these diverse perspectives, the team used a combination of the inductive and deductive heuristics delineated by Ogilvy and Schwartz

(2004) to develop the scenario premise (Figure 1). This process began with selecting the timeframe for the scenario—the years 2025–2028. These dates, which were 10–13 years in the future at the time, were chosen to provide a timeline that allowed the development of future possibilities, but was not so far in the future as to make the scenario become a work of science fiction. After the timeframe was established, the project team turned to the focal question: What emergency communication issues around MCM are most likely to exist 10 years from now?

To begin answering this question, the project team considered the key economic, environmental, political, social, and technological factors they felt were likely to emerge by 2025. Factors considered by the project team included prominent ones such as technological advances like the proliferation of tools to access the internet, increased use of the internet for things like social media and telemedicine, greater political and social polarizations, changing demographics in the United States including an aging baby boomer population, and climate change and urbanization that could result in the (re)emergence of zoonotic diseases.

After careful discussion of each of these factors, which included consideration of existing literature and theoretical approaches, the team considered which factors seemed inevitable given present conditions and which were the most likely to impact the direction of the scenario. From this process, two critical uncertainties were identified: the extent of access to information technology, that the team felt was inevitable, and the degree of fragmentation among populations along social, political, religious, and cultural lines, which the team felt would lead to novel communication issues. The project team then used these uncertainties to construct a scenario matrix illustrating the four possible futures that could be shaped by these trends (Figure 2). After careful consideration, the team ultimately chose the "echo-chamber"—a world comprised of isolated and highly fragmented communities with widespread access to information technology—as the future in which the prospective scenario would take place.

From this point, scenario-specific storylines were developed, drawing on the subject matter expertise of the project group, interviews with expert working group (EWG) members associated with the larger project, historical accounts of past MCM crises, contemporary media reports, and scholarly literature in sociology, emergency preparedness, health education, and risk communication. This process allowed the project team to identify expected and new communication dilemmas to include in the scenario. As one example of this, the project team considered how the internet and social media affect the social dynamics of health communication. Using the theory of false consensus bias and the findings on vaccination in social media (described previously in the literature review section),

**FIGURE 1:**
The scenario generation process, adapted from Ogilvy and Schwartz (2004).

| | |
|---|---|
| #1 - Identify focal issue and time frame | Single out a key decision or a strategic uncertainty that has long-range consequences important to the organization |
| #2 - Brainstorm a list of "key drivers" | Consider notable forces shaping and influencing the focal issue: social, technological, economic, natural, political |
| #3 - Sort "drivers" into "predetermined trends" and "critical uncertainties" | Distinguish inevitable trends that will play out the same no matter what *versus* important trends whose impacts are unsure |
| #4 - Select top 2 "critical uncertainties" and build 2x2 scenario matrix | Reduce each critical uncertainty to an axis with polar cases at each extremity; overlay the 2 axes and produce 4 futures to explore |
| #5 - Select 1 of the 4 futures and elaborate on a complete storyline | |
| Deepen the plot through systems thinking | Think of critical events, then delve into underlying patterns and structures that these events signal; use diagrams to see how forces interact |
| Tell a story with a beginning, middle, and end | Capture time and causality dimensions; first this, then that; generate a series of headlines describing events over the course of the scenario |
| Create characters | Personify the magnitude and direction of change by using real or iconic figues |
| Employ standard plot lines | Build on common narratives ("winners and losers" and "David and Goliath") |
| # 6 - Refine the plot through an iterative process of reflection, research, and revision | |
| #7 - Explore the strategic implications of the scenario | Return to initial focal issue to determine gaps, vulnerabilities, options facing the organization |

spread via social media and then maintained in the public view for months afterward by teenagers who enjoyed the shock value of the images. This specific case, titled "Going Viral," is presented later in this paper.

Once different dilemmas were identified, the team considered how the different storylines could reasonably fit together and what characters were necessary in order for these events to occur.

An outline for the scenario was then constructed using newspaper and other social media headlines as markers for key events; in many instances, these remained in the scenario in order to introduce the different dilemmas. Finally, the entire storyline was written in draft form as if the SPARS outbreak had occurred in the recent past, allowing some outcomes and conclusions to be drawn within the scenario.

From this point, scenario development entailed a recursive process of continued research and analysis by the project team, review and feedback from EWG members (summer 2015), and two rounds of external review by authorities on risk communication and the MCM enterprise (four individuals in fall 2015, three individuals in summer 2017). Comprising the project EWG were risk and crisis communication scholars; MCM developers, producers, and regulators; practitioners in medicine, public health, and pharmacy science; and experienced public health emergency managers at all levels of government. Revisions were made after each review in order to increase the accuracy and usefulness of the material presented in the scenario.

The final product, referred to hereafter as the SPARS scenario, is not intended to be a crystal ball of things to come; rather, it is meant to serve as a plausible narrative that illustrates a broad range of serious and frequently encountered challenges in the realm of risk and crisis communication. To increase the usefulness of the scenario, each response and recovery-phase dilemma is followed by food for thought questions that are meant to prompt readers, reading as individuals or in training groups, to consider how they might respond to similar situations or how they might prevent similar problems or classes of problems from occurring in the first place.

Like the studies of scenario-driven exercises (Skryabina et al., 2017) show, including those featuring emergency risk communication (Miller et al., 2017), the SPARS scenario is intended to prepare users for mitigating public health emergencies and managing MCM communication dilemmas more effectively. In the following sections, we outline the scenario environment and how the fictional outbreak begins. We then provide excerpts of two dilemma sections as examples of the larger document.

**FIGURE 2**:
Final Scenario Framework: Four possible futures
in which the SPARS pandemic unfolds.

<table>
<tr><td colspan="4">Unbridled access and openness to information technology (including social media)</td></tr>
<tr><td rowspan="2">Isolated communities, social fragmentation</td><td>"Echo-chamber"</td><td>"UN Security Council"</td><td rowspan="2">Diverse but integrated communities, "melting pot"</td></tr>
<tr><td>"Solitary Confinement"</td><td>"Shangri-La"</td></tr>
<tr><td colspan="4">Erratic, unequal access to information technology (including social media)</td></tr>
<tr><td colspan="4">"Echo-Chamber"—a technologically savvy, plugged in, but fragmented society in which groups that hold diverse worldviews consume information that continues to validate their own positions, allowing them to live in their own mental bubble; government agencies and citizens alike have ready access to all the latest informational tools.<br><br>"Solitary Confinement"—a society (including general population and public sector) with an uneven access to informational technology (due to lack of net neutrality, uneven infrastructure) that isolates differently minded communities.<br><br>"UN Security Council"—a technologically savvy, plugged in society where diversity reigns, but difference and tolerance are socially valued, and where information flows freely across different groups.<br><br>"Singapore"—a melting pot society, with peaceful co-existence of differently minded groups, but uneven levels of access to information technology.</td></tr>
</table>

# The SPARS Scenario: An Introduction

## Scenario Environment

The setting of SPARS is the world in 2025–2028. For this time period, the project team imagined a world that is simultaneously more connected and yet more divided. There is nearly universal access to wireless internet for even the poorest persons in the United States. Additionally, technological innovations and competition between technology companies have made an even wider range of information technology readily available to all. Despite the possibilities for these advancements to facilitate broad communication between individuals and communities, the project team also envisioned a future where many have chosen to self-restrict the sources they seek for information, often electing to interact only with those whom they agree with on significant issues. This trend increasingly isolates cliques from one another, making communication across and between these groups more difficult.

In relation to MCM communication more specifically, government agencies like the CDC have increasingly adopted social media technologies, including long-existing platforms such as Facebook, Snapchat, and Twitter, as well as emerging platforms like ZapQ—an interface that enables users to aggregate and archive media content from other platforms and communicate with cloud-based social groups based on common interests and current events. Federal and state public health organizations have also developed agency-specific applications and ramped up efforts to maintain and update agency websites.

Challenging this technological grip, however, are the diversity of new platforms and the speed with which social media communities evolve. Moreover, while technologically savvy and capable, these agencies still lag in terms of their "multilingual" skills, cultural competence, and ability to be present on all forms of social media. These agencies also face budget constraints, which complicates their efforts to improve public communications efficiency and effectiveness by increasing their presence in existing and emerging social media platforms.

## SPARS

After much consideration of possible emergency situations that would require MCM use, the project team decided on setting the storyline around a novel coronavirus that caused a mild, flu-like disease in most instances, but pneumonia and/or hypoxia requiring hospitalization and extensive medical treatment in a small minority of cases. The project team named this fictional pathogen the St. Paul Acute Respiratory Syndrome Coronavirus, or SPARS for short, because in the scenario it is first identified in St. Paul, Minnesota.

Two features of this disease are important to note because they impact how the storyline

of the scenario plays out, as well as some of the communication dilemmas that occur. First, the project team decided to make SPARS have an extended incubation period (7 to 10 days) but a short latent period (4 to 5 days). This complicates the scenario because infected persons in the story are capable of spreading the virus for up to 6 days before showing symptoms of the disease themselves. This feature of SPARS makes isolation procedures in the scenario, like urging people to stay home if they think they might be sick, less effective than what is typically expected for airborne pathogens and thus introduces novel dilemmas in the storyline. Second, the project team decided to make the morbidity and mortality from SPARS both significantly higher in children than adults, and among pregnant women and those with chronic respiratory conditions. This parallels disease characteristics associated with past disease outbreaks, including the H1N1 pandemic, and allowed for some communication dilemmas from the past to be revisited under different future circumstances.

In all, the SPARS scenario provides 19 specific story lines, and an associated 23 communication dilemmas for readers to consider. An outline of the entire storyline is available in Table 1, and a list of the communication dilemmas provided in the scenario can be found in Table 2. The following sections provide excerpts of two dilemmas included in the scenario as well as their associated communication dilemmas and food for thought questions.

## Response Scenario Excerpt

The following excerpt from the scenario takes place early on in the pandemic. One month previously the Food and Drug Administration (FDA) had issued an Emergency Use Authorization (EUA) for the antiviral Kalocivir. The drug had been evaluated as a therapeutic for other coronavirus-caused diseases and several million doses were maintained by the Strategic National Stockpile (SNS), which meant the drug could be deployed as necessary while production capacity was established to meet demand. The FDA and CDC provided information on the drug, but some differences in their messaging caused concern among certain groups including parents of young children. The specific communication dilemma this excerpt considers is how to confront the power of a single graphic image of a child in distress when one story is elevated to a population-level problem.

### "Going Viral"

Reports of negative side effects associated with Kalocivir began gaining traction in February 2026. Despite the negative response, public health agencies continued to make forward progress until February 22nd, when a video of a 3-year-old boy in North Carolina projectile vomiting immediately after taking a dose of Kalocivir went viral. In the video clip, the boy swallows a pediatric dose of liquid Kalocivir, vomits profusely, chokes, and then faints in the pool of his own vomit while his mother shrieks in the background.

This clip was widely shared across the United States with a variety of captions including #AntiviralsDontWork, #DontTake TheDrugs, and #NaturalCuresAreBetterThanThis. The hashtags, in turn, provided a way for people sharing these views to find one another and band together on social media. They formed ZapQ and other online discussion groups, which allowed them to receive any messages from group members via smartphones and internet accessing technology (IAT) instantaneously as they were posted. Some members of these ZapQ groups even began to use full-sized (12″×12″) IAT screens on the backs of their jackets, coats, and backpacks to loop the vomiting video for all in their immediate vicinity to see.

The social media groundswell quickly overwhelmed the capacity of local, state, and federal agencies to respond, and compliance with public health and medical recommendations dropped considerably. The FDA and other government agencies quickly attempted to remind the public that correlation does not equate to causation, and that vomiting was not a known side effect of Kalocivir. This message, while scientifically accurate, lacked appropriate empathy and failed to assuage the public's mounting fears. As a result, it was largely ignored, and public concern continued to grow.

In the following weeks, officials from the FDA, CDC, and other government organizations attempted to promote positive, accurate information about Kalocivir on several traditional and social media platforms in order to quell public fear. This messaging, however, was less than optimal both in terms of timing and dissemination. While the government took several days to provide an emotionally appropriate message, the spread of the viral video on social media was exponentially faster. By the time the government responded, most people across the country had already seen the vomiting video and formed their own conclusions. Additionally, in their responses, governmental organizations were not able to effectively access all social media platforms. ZapQ groups, for example, had closed memberships and typically could only be accessed via invitations from group members.

Both of these issues prompted government organizations to improve the timing and impact of their social media responses. While most government agencies, including the CDC and HHS, had long-established offices that were directed to coordinate social media and other communication efforts, the protocols of individual agencies and different agency cultures led to delayed and sometimes uncoordinated messages.

Despite the many outreach efforts by various government officials and entities, the government was ultimately unable to develop a suitable replacement for the initial vomiting video. By early June 2026, the video had become the most shared Zap clip among junior high and high school students across the country who appreciated the shock factor of the video. As a result, the public was continually re-exposed to the anti-Kalocivir message for several months after the initial incident and subsequent responses.

**TABLE 1:**
Timeline of Events in the "SPARS Pandemic 2025–2028" Scenario

## 2025

October 2005

The first US deaths occurred due to SPARS. Initially, these deaths were thought to have been caused by influenza.

November 2005

Cases of SPARS were reported across Minnesota and in six other states.
Thanksgiving holiday travel and Black Friday shopping facilitated spread of SPARS beyond the Midwest (26 states and multiple other countries by mid-December).
The WHO declared the SPARS pandemic to be a Public Health Emergency of International Concern.

December 2005

No treatment or vaccine for SPARS existed, but there was some evidence that the antiviral Kalocivir could be effective as a therapeutic. A proprietary vaccine developed and manufactured by a multinational livestock conglomerate (GMI) was proposed as a potential foundation for a human vaccine. The vaccine was developed to combat an outbreak of a similar respiratory coronavirus in hooved mammal populations in Southeast Asia, but the vaccine had not been licensed by any regulatory authority or tested in humans. There were concerns over potential side effects.

## 2026

January 2006

The US government contracted CynBio to develop and produce a human SPARS vaccine based on the GMI animal vaccine.

The HHS Secretary invoked the Public Readiness and Emergency Preparedness Act (PREP Act) to provide liability protection for the vaccine manufacturer and providers. Congress authorized and appropriated emergency funds under the PREP Act to provide compensation for potential adverse side effects from the vaccine.

capacity was established to meet demand.

The FDA, CDC, and NIH provided seemingly conflicting communications regarding the safety and efficacy of Kalocivir. In the United States, public anxiety around SPARS resulted in extensive use of Kalocivir, frequent self-reporting of SPARS symptoms, and a surge in demand for medical care.

By late January SPARS was detected in 42 countries and all US states.

February 2006

A lack of cultural competency in FDA and other governmental communication became apparent among various ethnic groups in the United States.

A video of a 3-year-old vomiting and fainting after taking a dose of Kalocivir was widely and rapidly spread via social media, strengthening opposition to the EUA.

The UK Medicines and Healthcare Products Regulatory Agency and the European Medicines Agency jointly authorized the emergency use of a new antiviral, VMax, in the United Kingdom and throughout the European Union. Some Americans attempted to gain access to VMax online or by traveling to Europe.

April 2006

The CDC publicized an updated (and significantly lower) case fatality rate in the United States; the perception of lesser risk triggered a drop in public interest.

May 2006

Production of Corovax, the SPARS vaccine produced by CynBio, was well underway.

Federal agencies initiated a communications campaign using well-known public figures with mixed results.

Polls indicated a 15–23% increase in SPARS and Kalocivir knowledge nationwide. Hip-hop icon BZee had success promoting public health messaging with an online video clip, but he lost credibility when he compared volunteers for Corovax trials with "volunteers" from the Tuskegee syphilis study.

Similarly, former President Bennett provided a non-committal response when asked if she would want Kalocivir for her new grandson.

Public health agencies discovered that a relatively new social media platform, UNEQL, was being used as a primary means of communication in college-aged populations.

June 2006

Corovax entered the final stage of its expedited review, and production capacity was increased. Ten million doses were expected to be available by July with fifty million more in August.

The CDC Advisory Committee on Immunization Practice (ACIP) announced vaccine priority groups. Healthcare providers were not included as a priority, inciting protests by doctors and nurses across the country.

In order to prioritize distribution of limited Corovax supply, the federal government requested that states report summary information for patient electronic health records (EHRs) to estimate the number of individuals in high-risk populations.

This effort was met with resistance from the public, who protested the federal government accessing their private medical information.

July 2006

A week prior to initiating the nationwide vaccination program, damage to a power grid in the Pacific Northwest resulted in a widespread power outage that lasted two weeks. State and local public health agencies initiated communications programs using posters and flyers to promote the vaccination program in the absence of electronic media.

Social media efforts across the country promoted the vaccination campaign, and crowdsourced data helped to increase efficiency in distributing the vaccine.

August 2006

The Corovax vaccination program met resistance from several groups: alternative medicine proponents, Muslims, African Americans, and anti-vaccination activists. Initially operating independently, these groups banded together via social media to increase their influence.

September 2006

Japan announced that it would not approve Corovax for use in Japan in favor of developing and producing its own vaccine.

October 2006

College students predominantly on the East and West coasts staged protests against the unequal global availability of Corovax. Vaccination rates among these students were below average for college students in other areas of the country.

November 2006

The anti-anti-vaccine movement, formed in the wake of the 2015 measles outbreak in the United States, reignited their efforts to combat the anti-vaccination super-group. The FDA, CDC, and other federal agencies also redoubled their communications efforts to promote the Corovax campaign. An increasing number of post-SPARS pneumonia cases were reported across the country.

December 2006

The nationwide vaccination program was expanded beyond the initial priority populations to include the rest of the country. Federal agencies initiated a vaccination communication program involving targeted online advertisements.

## 2027

February 2027

Post-SPARS pneumonia cases stressed inventories of antibiotics across the country. The HHS Secretary authorized distribution of the oldest lots of antibiotics from the SNS to supplement the antibiotic supply nationwide.

Tests of antibiotics in the SNS inventory determined that 94% of the remaining antibiotics in the oldest lots maintained sufficient potency. Tests conducted in August 2026 provided the basis for extending the expiration of these lots from 2027 to 2029.

March 2027

Rumors spread via traditional and social media that the government was dispensing expired antibiotics. Alyssa Karpowitz, a leader in the natural medicine movement, sought medical care at an emergency department after natural remedies failed to resolve her son's bacterial pneumonia. After successful treatment with proper antibiotics from the SNS supply, she touted the benefits of "expired" antibiotics in her social media circles.

April 2027

Crowd-sourced and independent epidemiology analysis of Corovax side effects conflicted with official federal reports. The independent analyses gained popularity in traditional and social media due to visual presentation and interactive content. Government attempts to respond with data and press releases largely failed.

May 2027

Reports of Corovax side effects began to gain traction. Several parents of children who experienced neurological symptoms after receiving the vaccination sued the federal government and CynBio. The lawsuit was dropped when they learned of compensation funds available through the PREP Act and the National Vaccine Injury Compensation Trust Fund.

November 2027

Initial reports of long-term side effects of the Corovax vaccine emerged. These reports arose primarily from those in the initial priority (high-risk) populations and were few in number. With little available data and numerous pre-existing conditions, initial studies were unable to identify a statistically significant association with any long-term effects. Claims for compensation were placed on indefinite hold until further data could be gathered and analysis completed. In response to public demand for long-term side effect compensation, the HHS Secretary invited Congress to conduct an independent investigation of the federal compensation process to alleviate concerns of impropriety. The public and media pressured Congress to increase the funds authorized for compensation under the PREP Act.

## 2028

August 2028

The SPARS pandemic was officially declared to be over; however, experts remain concerned about domestic animal reservoirs and the potential for future outbreaks.

TABLE 2 (ABOVE):
Emergency Communication Dilemmas Featured
in the "SPARS Pandemic 2025–2028" Scenario

## Response Phase

• Engendering public trust and a sense of self-efficacy when a crisis is still evolving and critical health information is incomplete
• Responding to public and political pressure to share information about potential MCMs in the development pipeline even though information may be incomplete or proprietary
• Maintaining trust in government processes for ensuring the timely development of safe and effective vaccines when novel threats arise
• Harmonizing inconsistent messaging across health agencies
• Appropriately tailoring public health messages to address the concerns and culture of specific communities
• Responding to the power of graphic images of a child in distress: one story that is elevated to a population-level problem
• Responding to demand for an alternative antiviral drug not available in the United States
• Responding to misinformation or doubt about an MCM generated by a prominent public figure
• Overlooking communication platforms used by specific groups; quickly gaining fluency and effectively engaging the public using a new media platform.
• Responding to public criticism about potential unequal access to MCMs like Kalocivir
• Maintaining public support after changing positions on MCM safety and efficacy
• Communicating the need for and reasoning behind the prioritization of scarce resources
• Publicizing MCM programs and availability to promote uptake and efficient distribution
• Providing real-time data on vaccine availability to align MCM supply with public demand
• Maintaining consistent messaging across electronic and non-electronic media and implementing a secondary communications plan if electronic media are not available
• Addressing multiple independent MCM concerns simultaneously
• Meeting the information needs of citizens who come from diverse cultural, social, and demographic backgrounds and who may have varying degrees of trust in health authorities
• Supporting the current MCM product in the face of opposition from a foreign regulatory agency
• Responding to complex ethical issues that are beyond the United States government's control

• Responding to questions regarding safety and efficacy of drugs that have extended shelf lives

Recovery Phase

• Communicating with the public about trustworthy sources of data and options for legal recourse in a climate of mistrust
• Bringing a sense of resolution to a period of crisis while striking a balance between the need to affirm collective grief/loss and the need to move forward
• Institutionalizing communications lessons from the 2025–2028 SPARS pandemic

Food for Thought Questions:

1. Why might communicating the science around MCM adverse effects alone not be enough to address people's fears and concerns about an MCM like Kalocivir? Why is it also important to communicate with compassion, concern, and empathy?
2. To what extent is having sufficiently skilled staff and organizational capacity to communicate via traditional media and social media platforms critical to influencing public debates and awareness about an MCM like Kalocivir?
3. What MCM communication challenges are likely to emerge among up-and-coming youth audiences who are avid consumers of interactive and visual forms of information?

Recovery Scenario Excerpt

The following excerpt from the scenario considers issues related with recovery, and how to communicate with the public about trustworthy sources of data and options for legal recourse in a climate of mistrust. At this point in the storyline, Corovax, the FDA-approved vaccine for SPARS, has been released for more than 9 months and the United States is solidly in the recovery phase of the pandemic. SPARS is now uncommon in the US and public focus has shifted from the disease to the potential side effects of SPARS treatments including the Corovax vaccine.

"Vaccine Injury"

As time passed and more people across the United States were vaccinated, claims of adverse side effects began to emerge. Several parents claimed that their children were experiencing neurological symptoms similar to those seen among livestock exposed to the GMI vaccine. By May 2027, parental anxiety around this claim had intensified to the point of lawsuits. That month, a group of parents whose children developed mental retardation as a result of encephalitis in the wake of Corovax vaccination sued the federal govern-

ment, demanding removal of the liability shield protecting the pharmaceutical companies responsible for developing and manufacturing Corovax.

The growing plaintiff cohort quickly withdrew their suit upon learning that the National Vaccine Injury Compensation Trust Fund (NVICTF) and an emergency appropriation of funds authorized by Congress under the PREP Act existed to provide financial reimbursement to those who were adversely affected by the Corovax vaccine in order to cover healthcare costs and other related expenses. Given the positive reaction to the federal government's response and the fact that the majority of US citizens willing to be vaccinated had already been immunized, the negative publicity surrounding adverse reactions had little effect on nationwide vaccination rates. The focus on adverse side effects, however, resulted in a considerable increase in the number of compensation claims filed, and many grew concerned about the long-term effects that Corovax could have on their health. This concern was particularly high among some African American parents who continued to question the government's motives regarding the Corovax vaccination campaign.

While the FDA, CDC, and other agencies were busy researching possible connections between Corovax and the reported neurological side effects, their efforts were continually undermined by epidemiological analyses produced by various non-governmental individuals and groups. The popular science blogger EpiGirl, for example, began posting interactive maps of the incidence of Corovax side effects in April 2027. To create the maps, EpiGirl collected anecdotes of adverse Corovax side effects using Facebook, Twitter, and YouTube and combined them with data downloaded from the HHS Vaccine Adverse Event Reporting System (VAERS), a national vaccine safety surveillance program maintained by the CDC and FDA. EpiGirl also encouraged those among her subscribers who were Apple product users to share health data with her via Apple's Research Kit and Health Kit applications. EpiGirl's maps were consequently shared widely in social media circles and even included in local and national news reports.

The federal government became concerned about the validity of EpiGirl's anecdotal data and the widespread sharing of patient information via the internet. EpiGirl's data showed a significantly higher incidence rate of nearly every reported side effect; however, federal officials believed that this was largely due to duplicate entries resulting from compiling data from multiple sources. Additionally, EpiGirl's data did not seek to address the cause of the reported side effects, only the incidence rate. Publication of similar results from organizations such as Patients-Like-Me, a group closely associated with the natural medicine movement, further legitimized these independent reports. The government attempted to respond to these claims through formal press releases, but these were neither as visually appealing nor as interactive as EpiGirl's maps and were, therefore, largely ignored.

## Food for Thought Questions:

1. How might advance development and testing of recovery messages that specifically address the topics of adverse side effects and the NVICTF help improve health authorities' ability to respond to public distress about medical issues emerging after an MCM campaign? What are some messages that would warrant such testing?
2. Despite the uncertain science about the link between Coravax and the reported neurological symptoms, why should health officials still communicate with compassion and genuine sym- pathy toward those in the vaccinated population who experience medical issues subsequent to being vaccinated?
3. Given growing interest in open data systems and the application of "crowd sourcing" to solve complex problems, how might public health officials take greater advantage of two-way communication with an interested public in the aftermath of the SPARS outbreak? For instance, how might input and analysis from members of the public help improve adverse event monitoring or assess the strengths and weaknesses of a specific MCM campaign?

## Crafting Scenarios: Lessons Learned

Creating the scenario described above was a months-long process that involved many iterative steps. While the basic process of scenario development is both described above and detailed by others including Ogilvy and Schwartz (2004), the following are offered as lessons learned in order to assist in the development and design of scenarios in the future:

1. Having a project team with different academic backgrounds (i.e., medicine, public health, and the social sciences) provided a solid foundation for developing the premise of the future in which the scenario would take place. Different perspectives, disagreements, and even lively debates were essential to developing a premise that was both realistic and meaningful. This process also provided forward momentum for the development of specific storylines.
2. Storyboarding the timeline of events was important to maintaining coherency in the project. In the development of the SPARS scenario, storyboarding was not a one-time process but rather an ongoing exercise that occurred throughout scenario development.
3. As storyboarding was occurring, it was essential to keep in mind the audiences for the project. In several cases, lessons specific audiences needed to walk away with were the starting point; the project team used these to work backward to make sure those lessons were fully incorporated into the storyline.
4. A focus on small details, including using supporting illustrations like newspaper and social media headlines, was necessary to make the scenario as realistic as possible. This process of "sweating the small stuff" also provided a mechanism for the project team to check and recheck the accuracy of the overall product.
5. Vetting the scenario with a group of subject matter experts was critical. In the SPARS

scenario, this process helped identify dilemmas that were of particular relevance to specific target audiences as well as detect plot holes and inaccuracies that were necessary to fix in order for the storyline to be both believable and useful.
6. Finally, developing facilitator guides along with the scenario was a way to increase the facility of the scenario as a teaching tool.

## Conclusion

Effective communication about medical countermeasures—including drugs, devices, and biologics (e.g., vaccines)—is often critical in emergency situations. Such communication, how- ever, does not just happen. It must be planned and prepared for. Prospective scenarios, like the SPARS scenario described in this paper, offer important opportunities for communication planning and preparation by enabling readers, both individually and in discussion with others, to rehearse responses to communication dilemmas; encouraging readers to envision what the next generation of best practices in MCM emergency communication may entail, given technological and social trends such as the growing influence of social media and increasing levels of social isolation; and prompting readers to consider and prepare for other future communication dilemma possibilities. In today's world of rapidly-evolving ICT, such preparation is especially crucial.

## ORCID

Emily K. Brunson
https://orcid.org/0000-0001-6321-1882
Hannah Chandler
https://orcid.org/0000-0003-0262-2295
Gigi Kwik Gronvall
https://orcid.org/0000-0003-2514-146X
Sanjana Ravi
https://orcid.org/0000-0001-9769-6814
Monica Schoch-Spana
https://orcid.org/0000-0002-8397-8367
Tara Kirk Sell
https://orcid.org/0000-0002-8342-476X
Matthew P. Shearer
https://orcid.org/0000-0002-2031-2904

## REFERENCES

Allchin D. (2013). Problem- and case-based learning in science: An introduction to distinctions, values, and outcomes. CBE-Life Sciences Education, 12(3), 364–372. https://doi.

org/10.1187/ cbe.12-11-0190 [continued page after next page].
Belongia, E. A., Kieke, B., Lynfield, R., Davis, J. P., & Besser, R. E. (2005). Demand for prophylaxis after bioterrorism-related anthrax cases. Emerging Infectious Diseases, 11(1), 42–47. https://doi.org/10.3201/eid1101.040272
Bishop, P., Hines, A., & Collins, T. (2007). The current state of scenario development: An overview of techniques. Foresight, 9(1), 5–25. https://doi.org/10.1108/14636680710727516
Borjeson, L., Hojer, M., Dreborg, K. H., Ekvall, T., & Finnveden, G. (2006). Scenario types and techniques: Towards a user's guide. Futures, 38, 723–739. https://doi.org/10.1016/j.futures. 2005.12.002
Carlsen, B., & Glenton, C. (2016). The swine flu vaccine, public attitudes, and research interpretations: A systematic review of qualitative research. BMC Health Services Research 16(1), 203. https://doi.org/10.1186/s12913-016-1466-7
Centers for Disease Control and Prevention (CDC). (2018). Crisis and Emergency Risk Communication (CERC) manual. Retrieved from web archive at https://web.archive.org/web/20190614141121/https://emergency.cdc.gov/cerc/ manual/index.asp
Charles-Smith L. E., Reynolds, T. L., Cameron, M. A., Conway, M., Lau, E. H. Y., Olsen, J. M., Pavlin, J. A., Shigematsu, M., Streichert, L. C., Suda, K. J., & Corley, C. D. (2015). Using social media for actionable disease surveillance and outbreak management: A systematic literature review. PLOS ONE, 10(10): e0139701. https://doi.org/10.1371/journal.pone.0139701
Courtney, B., & Sadove, E. (2015). Medical countermeasures: Emergency preparedness and response roles and authorities. In: D. G. Adams, R. M. Cooper, M. J. Hahn, J. S. Kahan (Eds.), Food and Drug Law and Regulation (3rd ed., pp. 791–815). Food and Drug Law Institute.
Dart, R. C., Bronstein, A. C., Spyker, D. A., Cantilena, L. R., Seifert, S. A., Heard, S. E., & Krenzelok, E. P. (2015). Poisoning in the United States: 2012 emergency medicine report of the National Poison Data System. Annals of Emergency Medicine, 65(4), 416– 422. https://doi.org/10.1016/j.annemergmed.2014.11.001
Durigon, M., & Kosatsky, T. (2012). Calls managed by the BC Drug and Poison Information Centre following the 2011 nuclear reactor incident at Fukushima, Japan. Canadian Pharmacy Journal, 145(6), 256–258. https://doi.org/10.3821/145.6.cpj256
Earthquake Engineering Research Institute (EERI). (2019). Developing earthquake scenarios. Retrieved from web archive at: https://web.archive.org/web/20190416215029/http://www. nehrpscenario.org/
Edwards, I. R., & Lindquist, M. (2011). Social media and networks in pharmacovigilance: Boon or bane? Drug Safety, 34(4), 2676– 2271. https://doi.org/10.2165/11590720-000000000-00000
Epling, J. W., Morrow, C. W., Sutphen, S. M., & Novick, L. F. (2003). Case-based teaching in preventive medicine: Rationale, development, and implementation. American Journal of Preventive Medicine, 24(4Suppl), 85–89. https://doi.org/10.1016/S0749 3797(03)00028-X
European Centre for Disease Prevention and Control (ECDC). (2014). Handbook on simulation exercises in EU public health settings. Retrieved from web archive at https://web.archive.org/web/20191107180459/ and:

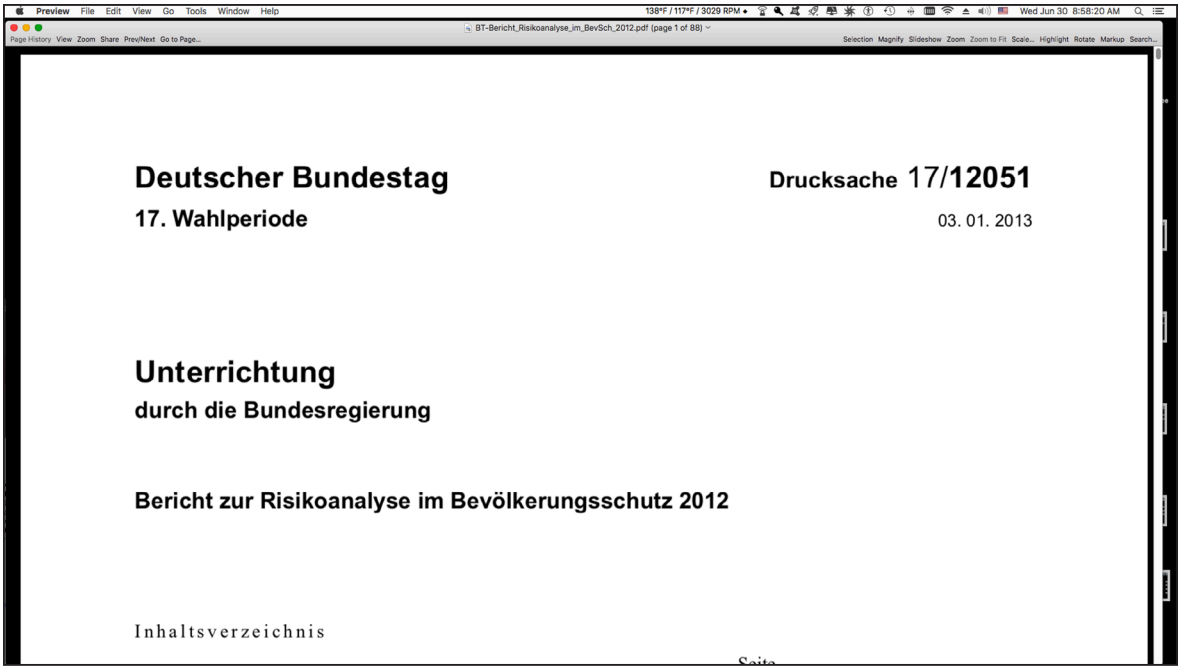
https://ecdc.europa.eu/sites/portal/files/documents/simulation-exercise-manual.pdf
Federal Emergency Management Agency (FEMA). (2019). Homeland Security Exercise and Evaluation Program (HSEEP). Retrieved from web archive a:
https://web.archive. org/web/20191004155411/https://www.fema.gov/hseep
Fox, S. (2011). Health topics: 80% of internet users look for health information online. Pew Research Center's Internet & American Life Project. Retrieved from web archive at https://web.archive.org/web/20191107180641/https://www.issuelab. org/resources/9648/9648.pdf
Grajales, F. J., Sheps, S., Kendall, H., Novak-Lauscher, H., & Eysenbach G. (2014). Social media: A review and tutorial of applications in medicine and health care. Journal of Medical Internet Research, 16(2), e13. https://doi.org/10.2196/jmir.2912
Guidry, J. P. D., Carlyle, K., Messner, M., & Yin, J. (2015). On pins and needles: How vaccines are portrayed on Pinterest. Vaccine, 33, 5051–5056. https://doi.org/10.1016/j.vaccine.2015.08.064
Hamilton, D. S., & Smith, B. T. (2006). Atlantic Storm. EMBO Reports, 7(1), 4–9.
https://doi.org/10.1038/sj.embor.7400606
Hawn, C. (2009). Take two aspirin and tweet me in the morning: How Twitter, Facebook, and other social media are reshaping health care. Health Affairs, 28(2), 361–368.
https://doi. org/10.1377/hlthaff.28.2.361
Henrich, N., & Holmes, B. (2011). What the public was saying about the H1N1 vaccine: Perceptions and issues discussed in on-line comments during the 2009 H1N1 pandemic. PLoS One, 6(4), e18479. https://doi.org/10.1371/journal.pone.0018479
Hinton, S., & Hjorth, L. (2013). Understanding Social Media. Sage. Househ, M., Borycki, E., & Kushniruk, A. (2014). Empowering patients through social media: The benefits and challenges. Health Informatics Journal, 20(1), 50–58.
https://doi.org/10.1177/1460458213476969
Inch, J., Watson, M. C., Anakwe-Umeh, S., on behalf of the Yellow Card Study Collaboration. (2012). Patient versus healthcare professional spontaneous adverse drug reaction reporting: A systematic review. Drug Safety, 35(10), 807–818. https://doi. org/10.1007/bf03261977
Kata, A. (2012). Anti-vaccine activists, Web 2.0, and the postmodern paradigm—an overview of tactics and tropes used online by the anti-vaccination movement. Vaccine, 30, 3778–3789. https://doi.org/10.1016/j.vaccine.2011.11.112
Keelan, J., Pavri-Garcia, V., Tomlinson, G., & Wilson, K. (2007). YouTube as a source of information on immunization: A content analysis. Journal of the American Medical Association, 298(21), 2482–2484. https://doi.org/10.1001/jama.298.21.2482
Kreps, G. L., & Neuhauser, L. (2010). New directions in eHealth communication: Opportunities and challenges. Patient Education and Counseling, 78, 329–336.
https://doi. org/10.1016/j.pec.2010.01.013
Lin, L., Savoia, E., Agboola, F., & Viswanath, K. (2014). What have we learned about communication inequalities during the H1N1 pandemic: A systematic review of the literature.

BMC Public Health, 14(1), 484. https://doi.org/10.1186/1471-2458-14-484
Liu, B. F., Quinn, S. C., Egnoto, M., Freimuth, V., & Boonchaisri, N. (2017). Public understanding of medical countermeasures. Health Security, 15(2), 194–206. https://doi.org/10.1089/ hs.2016.0074
Mahmoud, M., Liu, Y., Hartmann, H., Stewart, S., Wagener, T., Semmens, D., Stewart, R., Gypta, G., Dominguez, D., Dominguez, F., Hulse, D., Letcher, R., Rashleigh, B., Smith, C., Steer, R., Ticehurst, J., Twery, M., van Delden, H., Waldick, R., White, D., & Winter, L. (2009). A formal framework for scenario development in support of environmental decision-making. Environmental Modeling & Software, 24(7), 798–808. https://doi.org/10.1016/j.envsoft.2008.11.010
Matsuda, S., Kotonari, A., Tomizawa, S., Sone, M., Tanaka, R., Kuriki, H., & Takahashi, Y. (2017). Analysis of patient narratives in diseases blogs on the internet: An exploratory study of social pharmacovigilance. JMIR Public Health and Surveillance, 3(1), e10. https://doi.org/10.2196/publichealth.6872
Miller, A. N., Sellnow, T., Neuberger, L., Todd, A., Freihaut, R., Noyes, J., Allen, T., Alexander, N., Vanderford, M., & Gamhewage, G. (2017). A systematic review of literature on effectiveness of training in emergency risk communication. Journal of Health Communication, 22(7), 612–629. https://doi. org/10.1080/10810730.2017.1338802
National Research Council (NRC). (2011). National Earthquake Resilience: Research, Implementation, and Outreach. The National Academies Press. https://doi.org/10.17226/13092
Ogilvy, J., & Schwartz, P. (2004). Plotting Your Scenarios. Global Business Network. Retrieved from web archive at https://web.archive.org/web/20190803235747/ and http://www.meadowlark.co/plotting_your_scenarios.pdf
O'Toole, T., Mair, M., & Inglesby, T. V. (2002). Shining Light on "Dark Winter." Clinical Infectious Diseases, 34(7), 972–983. https://doi.org/10.1086/339909
Poland, G. A., Jacobson, R. M., & Ovsyannikova, I. G. (2009). Trends affecting the future of vaccine development and delivery: The role of demographics, regulatory science, the anti-vaccine movement, and vaccinomics. Vaccine, 27, 3240–3244. https://doi.org/10.1016/j.vaccine.2009.01.069
Preuss, J., & Godfrey, J. (2006). Guidelines for Developing an Earthquake Scenario. Earthquake Engineering Research Institute (EERI). Retrieved from web archive at https://web.archive.org/web/20190812010728/ and https://mitigation.eeri.org/files/Developing.a.Scenario.pdf
Quinn, S. C., Thomas, T., & Kumar, S. (2008). The anthrax vaccine and research: Reactions from postal workers and public health officials. Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science, 6(4), 321–333. https://doi.org/10.1089/ bsp.2007.0064
Rice, L., & Sara, R. (2018). Updating the determinants of health model in the information age. Health Promotion International, 1–9. https://doi.org/10.1093/heapro/day064
Schoch-Spana, M., Brunson, E. K., Shearer, M. P., Ravi, S., Sell, T. K., Chandler, H., Gronvall, G. K. (2017). The SPARS Pandemic, 2025–2028: A Futuristic Scenario for Public Health Risk Communicators. Johns Hopkins Center for Health Security. Retrieved from web archive at

https://web.archive.org/web/20190329230151/ and http://www.centerforhealthsecurity.org/our-work/pubs_archive/pubs-pdfs/2017/spars-pandemic-scenario.pdf
Schoch-Spana, M., Gronvall, G. K., Brunson, E. K., Sell, T. K., Ravi, S., Shearer, M. P., & Collins, H. (2016). How to Steward Medical Countermeasures and Public Trust in an Emergency—A Communication Casebook for FDA and Its Public Health Partners. Johns Hopkins Center for Health Security. Retrieved from web archive at https://web.archive.org/web/20190628210856/ and http://www.centerforhealth security.org/our-work/events/2016%20FDA%20MCM/FDA Casebook.pdf
Skryabina, E., Reedy, G., Amlôt, R., Jaye, P., & Riley, P. (2017). What is the value of health emergency preparedness exercises? A scoping review study. International Journal of Disaster Risk Reduction, 21, 274–283. https://doi.org/10.1016/j. ijdrr.2016.12.010
Sloane, R., Osanlou, O., Lewis, D., Bollega, D., Maskell, S., & Pirmohamed, M. (2015). Social media and pharmacovigilance: A review of the opportunities and challenges. British Journal of Clinical Pharmacology, 80(4), 910–920. https://doi. org/10.1111/bcp.12717
Steelfisher, G., Blendon, R., Ross, L. J., Collins, B. C., Ben-Porath, E. N., Bekheit, M. M., & Mailhot, J. R. (2011). Public response to an anthrax attack: Reactions to mass prophylaxis in a scenario involving inhalation anthrax from an unidentified source. Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science, 9(3), 239–250. https://doi.org/10.1089/bsp.2011.0005
Tyrawski J., & DeAndrea, D. C. (2015). Pharmaceutical companies and their drugs on social media: A content analysis of drug information on popular social media sites. Journal of Medical Internet Research, 17(6), e130. https://doi.org/10.2196/ jmir.4357
Ulmer, R. R., Sellnow, T. L., & Seeger, M. W. (2017). Effective Crisis Communication: Moving from Crisis to Opportunity. SAGE Publications, Inc.
Uscher-Pines, L., Maurer, J., & Harris, K. M. (2011). Racial and ethnic disparities in uptake and location of vaccination for 2009—H1N1 and seasonal influenza. American Journal of Public Health, 101(7), 1252–1255. https://doi.org/10.2105/ ajph.2011.300133
Varum, C. A., & Melo, C. (2010). Directions in scenario planning literature—A review of the past decades. Futures, 42(4), 355– 369. https://doi.org/10.1016/j.futures.2009.11.021
Whitcomb, R. C., Ansari, A. J., Buzzell, J. J., McCurley, J. M., Miller, C. W., Smith, J. M., & Evans, D. L. (2015). A public health perspective on the US response to the Fukushima Radiological Emergency. Health Physics, 108(3), 357–363. https://doi. org/10.1097/hp.0000000000000198
Wilkinson, A., & Eidinow, E. (2008). Evolving practices in environmental scenarios: A new scenario typology. Environmental Research Letters, 3(4), 045017.
https://doi.org/10.1088/1748-9326/3/4/045017
Witteman, H. O., & Zikmund-Fisher, B. J. (2012). The defining characteristics of Web 2.0 and their potential influence in the online vaccination debate. Vaccine, 30, 3734–3740.
https://doi.org/10.1016/j.vaccine.2011.12.039
Wolfe, R. M., Sharp, L. K., & Lipsky, M. S. (2002). Content and design attributes of antivaccination web sites. Journal of the American Medical Association, 287(24), 3245–3248.

https://doi.org/10.1001/jama.287.24.3245
World Health Organization (WHO). (2018). A practical guide for developing and conducting simulation exercises to test and validate pandemic influenza preparedness plans. Retrieved from web archive at https://web.archive.org/web/20191107181633/ and https://extranet.who.int/sph/sites/default/files/document-library/document/9789241514507-eng.pdf

The 2012 scenario below, in German, describes an extraordinary epidemic based on the spread of a new pathogen. For this, the hypothetical but realistic pathogen "Modi-SARS" was used. A SARS-like virus was chosen among others. Against the background that in 2003 the natural variant quickly pushed very different health systems to their limits. The past has already shown that pathogens with novel properties that trigger a serious epidemic can occur suddenly (e.g. SARS coronavirus (CoV), H5N1 influenza virus, Chikungunya virus, HIV). Using simplified Assumptions, the hypothetical course of a pandemic in Germany was modeled for this particularly specific Modi SARS virus, which is both nationally relevant and plausible.



**Deutscher Bundestag** **Drucksache 17/12051**

**17. Wahlperiode** 03. 01. 2013

**Unterrichtung**

**durch die Bundesregierung**

**Bericht zur Risikoanalyse im Bevölkerungsschutz 2012**

Inhaltsverzeichnis

# The Most Horrific Crime Committed Yet During The Injectable Bio-Warfare Agenda

While the list of crimes committed by authorities during the COVID-19 pandemic is a long one, perhaps the biggest crime of all is the purposeful suppression of safe and effective treatments. At this point, it seems quite clear that this was done to protect the COVID jab rollout. The strategy is a jab in every arm.

The COVID shots were brought to market under emergency use authorization (EUA), which can only be obtained if there are no other alternatives available. In a sane world, the COVID gene therapies would never have gotten an EUA, as there are several safe and effective treatment options available that prevent hospitalization and generally lead to full recovery.

One treatment that stands out above the others is ivermectin, a decades-old antiparasitic drug that is on the World Health Organization's list of essential medications, has been prescribed over 3.5 billion times, won the Nobel Prize for Medicine in 2015 and is used by 60% of Sub-Saharan Africa. In fact, if you were to travel to Africa prior to COVID-19 you would have been routinely prescribed Ivermectin.

What makes ivermectin particularly useful in COVID-19 is the fact that it works both in the initial viral phase of the illness, when antivirals are required, as well as the inflammatory stage, when the viral load drops off and anti-inflammatories become necessary. It's been shown to significantly inhibit SARS-CoV-2 replication in vitro, [1] speed up viral clearance and dramatically reduce the risk of death.

## Gold Standard Review Supports Use of Ivermectin

Dr. Tess Lawrie, a medical doctor, Ph.D., researcher and director of Evidence-Based Medicine Consultancy Ltd (video: https://www.brighteon.com/8a40790b-a4cf-4014-979c-e34931792
cca) [2]. in the U.K., has been trying to get the word out about ivermectin. To that end, she helped organize the British Ivermectin Recommendation Development (BIRD) panel [3] and the International Ivermectin for COVID Conference, [4] which was held online, April 24, 2021. Dr. Lawrie has already submitted her findings to the World Health Organization and has submitted medical reviews at request in the past.

Twelve medical experts [5] from around the world shared their knowledge during this conference, reviewing mechanism of action, protocols for prevention and treatment, in-

cluding so-called long-hauler syndrome, research findings and real world data. All of the lectures, which were recorded via Zoom, can be viewed on Bird-Group.org [6].

Lawrie has published several systematic reviews and meta-analyses of studies looking at ivermectin for the prevention and treatment of COVID-19 infection. A rapid review performed on behalf of the Front Line COVID-19 Critical Care Alliance (FLCCC) in the U.S., January 3, 2021, found the drug "probably reduces deaths by an average 83% compared to no ivermectin treatment." [7]

Her February 2021 meta-analysis, which included 13 studies, found a 68% reduction in deaths. This is an underestimation of the beneficial effect, because one of the studies included used hydroxychloroquine (HCQ) in the control arm. Since HCQ is an active treatment that has also been shown to have a positive impact on outcomes, it's not surprising that this particular study did not rate ivermectin as better than the control treatment (which was HCQ).

Two months later, March 31, 2021, Lawrie published an updated analysis that included two additional randomized controlled trials. This time, the mortality reduction was 62%. When four studies with high risk of bias were removed during a subsequent sensitivity analysis, they ended up with a 72% reduction in deaths.

Sensitivity analyses are done to double-check and verify results. Since the sensitivity analysis rendered an even better result, it confirms the initial finding. In other words, ivermectin is unlikely to reduce mortality by anything less than 62%.

Lawrie reviewed the February and March analyses and other meta-analyses in an interview with Dr. John Campbell, featured in "More Good News on Ivermectin." Lawrie has now published her third systematic review. According to this paper, published June 17, 2021 in the American Journal of Therapeutics [8]:

"*Meta-analysis of 15 trials found that ivermectin reduced risk of death compared to no ivermectin (average risk ratio 0.38 …) … Low-certainty evidence found that ivermectin prophylaxis reduced COVID-19 infection by an average 86% … Secondary outcomes provided less certain evidence. Low-certainly evidence suggested that there may be no benefit with ivermectin for 'need for mechanical ventilation,' whereas effect estimates for 'improvement' and 'deterioration' clearly favored ivermectin use. Severe adverse events were rare among treatment trials …*"

## World Health Organization Refuses to Recommend Ivermectin

Despite the fact that most of the evidence favors ivermectin, when the WHO finally up-

dated its guidance on ivermectin at the end of March 2021, [9,10] they largely rejected it, saying more data are needed. They only recommend it for patients who are enrolled in a clinical trial.

Yet, they based their negative recommendation on a review that included just five studies, which still ended up showing a 72% reduction in deaths. What's more, in the WHO's summary of findings, they suddenly include data from seven studies, which combined show an 81% reduction in deaths. The confidence interval is also surprisingly high, with a 64% reduction in deaths on the low end, and 91% on the high end.

Even more remarkable, their absolute effect estimate for standard of care is 70 deaths per 1,000, compared to just 14 deaths per 1,000 when treating with ivermectin. That's a reduction in deaths of 56 per 1,000 when using the drug. The confidence interval is between 44 and 63 fewer deaths per 1,000.

Despite that, the WHO refuses to recommend this drug for COVID-19. Rabindra Abeyasinghe, a WHO representative to the Philippines, commented that using ivermectin without "strong" evidence is "harmful" because it can give "false confidence" to the public [11].

## Why Ivermectin Has Been Censored

If you've been trying to share the good news about ivermectin, you're undoubtedly noticed that doing so is incredibly difficult. Many social media companies are banning such posts outright.

Promoting ivermectin on YouTube, or even discussing benefits cited in published research, violates the platform's posting policies. DarkHorse podcast host Bret Weinstein, Ph.D., is but one of the victims of this censorship policy.

His interviews with medical and scientific experts such as Dr. Pierre Kory, a lung and ICU specialist, former professor of medicine at St. Luke's Aurora Medical Center in Milwaukee, Wisconsin, and the president and chief medical officer [12] of the FLCCC, and Dr. Robert Malone, the inventor of the mRNA and DNA vaccine core platform technology, [13] have been deleted from the platform. The interview with Malone had more than 587,330 views by the time it was wiped from YouTube [14].

But why? Why don't they want people to feel confident that there's treatment out there and that COVID-19 is not the death sentence they've been led to believe it is? The short answer is because ivermectin threatens the vaccine program. As explained by Andrew Bannister in a May 12, 2021, Biz News article [15]:

"What if there was a cheap drug, so old its patent had expired, so safe that it's on the WHO's lists of Essential and Children's Medicines, and used in mass drug administration rollouts?

What if it can be taken at home with the first signs COVID symptoms, given to those in close contact, and significantly reduce COVID disease progression and cases, and far fewer few people would need hospitalization?

The international vaccine rollout under Emergency Use Authorization (EUA) would legally have to be halted. For an EUA to be legal, 'there must be no adequate, approved and available alternative to the candidate product for diagnosing, preventing or treating the disease or condition.'

The vaccines would only become legal once they passed level 4 trials and that certainly won't happen in 2021 … The vaccine rollout, outside of trials, would become illegal.

The vaccine manufactures, having spent hundreds of million dollars developing and testing vaccines during a pandemic, would not see the $100bn they were expecting in 2021 … Allowing any existing drug, at this time, well into stage 3 trials, to challenge the legality of the EUA of vaccines, is not going to happen easily."

## The WHO and Drug Companies Are Severely Compromised

The WHO's rejection of ivermectin only makes sense if a) you take into account the EUA requirements; and b) remember that the WHO receives a significant portion of its funding from private vaccine interests.

The Bill & Melinda Gates Foundation is the second largest funder of the WHO after the United States, and The GAVI Alliance, also owned by Gates, is the fourth largest donor. The GAVI Alliance exists solely to promote and profit from vaccines, and for several years, the WHO director-general, Tedros Adhanom Ghebreyesus, served on the GAVI board of directors [16].

As reported by Bannister, Merck, the original patent holder of ivermectin, also has severe conflicts of interest that appear to have played a role in the rejection of ivermectin. He writes [17]:

"Ivermectin has been used in humans for 35 years and over 4 billion doses have been administered. Merck, the original patent holder, [18] donated 3.7 billion doses to developing countries … Its safety is documented at doses twenty times the normal …

Merck's patent on Ivermectin expired in 1996 and they produce less than 5% of global supply. In 2020 they were asked to assist in Nigerian and Japanese trials but declined both.

In 2021 Merck released a statement claiming that Ivermectin was not an effective treatment against Covid-19 and bizarrely claimed, 'A concerning lack of safety data in the majority of studies' of the drug they donated to be distributed in mass rollouts, by primary care workers, in mass campaigns, to millions in developing countries.

The media reported the Merck statement as a blinding truth without looking at the conflict of interests when days later, Merck received $356m from the US government to develop an investigational therapeutic.

The WHO even quoted Merck, as evidence, that it didn't work, in their recommendation against the use of Ivermectin. It's a dangerous world when corporate marketing determines public health policy."

## FLCCC Calls for Widespread and Early Use of Ivermectin

In the U.S., the FLCCC has been calling for widespread adoption of ivermectin, both as a prophylactic and for the treatment of all phases of COVID-19, [19,20] and Kory has testified to the benefits of ivermectin before a number of COVID-19 panels, including the Senate Committee on Homeland Security and Governmental Affairs in December 2020 [21] and the National Institutes of Health COVID-19 Treatment Guidelines Panel in January 2021 [22].

Based on a meta-analysis of 18 randomized controlled trials, ivermectin produces large statistically significant reductions in mortality, time to clinical recovery, and time to viral clearance.
As noted by the FLCCC [23].

"The data shows the ability of the drug Ivermectin to prevent COVID-19, to keep those with early symptoms from progressing to the hyper-inflammatory phase of the disease, and even to help critically ill patients recover.

… numerous clinical studies — including peer-reviewed randomized controlled trials — showed large magnitude benefits of Ivermectin in prophylaxis, early treatment and also in late-stage disease. Taken together … dozens of clinical trials that have now emerged from around the world are substantial enough to reliably assess clinical efficacy." The FLCCC has published three different COVID-19 protocols, all of which include the use of ivermectin:

I-MASK+ [24] — a prevention and early at-home treatment protocol
I-MATH+ [25] — an in-hospital treatment protocol. The clinical and scientific rationale for this protocol has been peer-reviewed and was published in the Journal of Intensive Care Medicine [26] in mid-December 2020
I-RECOVER [27] — a long-term management protocol for long-haul syndrome
In addition to Lawrie's meta-analysis in the American Journal of Therapeutics, the FLCCC has also published a scientific review [28] in that same journal.

This paper, "Review of the Emerging Evidence Demonstrating the Efficacy of Ivermectin in the Prophylaxis and Treatment of COVID-19," published in the May/June 2021 issue, found that, based on a meta-analysis of 18 randomized controlled trials, ivermectin produces "large statistically significant reductions in mortality, time to clinical recovery, and time to viral clearance."

## Ivermectin Significantly Reduces Infection Risk and Death

The FLCCC also found that when used as a preventive, ivermectin "significantly reduced risks of contracting COVID-19." In one study, of those given a dose of 0.4 mg per kilo on Day 1 and a second dose on Day 7, only 2% tested positive for SARS-CoV-2, compared to 10% of controls who did not get the drug.

In another, family members of patients who had tested positive were given two doses of 0.25 mg/kg, 72 hours apart. At follow up two weeks later, only 7.4% of the exposed family members who took ivermectin tested positive, compared to 58.4% of those who did not take ivermectin.

In a third, which unfortunately was unblended, the difference between the two groups was even greater. Only 6.7% of the ivermectin group tested positive compared to 73.3% of controls. According to the FLCCC, "the difference between the two groups was so large and similar to the other prophylaxis trial results that confounders alone are unlikely to explain such a result."

The FLCCC also points out that ivermectin distribution campaigns have resulted in "rapid population-wide decreases in morbidity and mortality," which indicate that ivermectin is "effective in all phases of COVID-19." For example, in Brazil, three regions distributed ivermectin to its residents, while at least six others did not. The difference in average weekly deaths is stark.

In Santa Catarina, average weekly deaths declined by 36% after two weeks of ivermectin distribution, whereas two neighboring regions in the South saw declines of just 3% and

5%. Amapa in the North saw a 75% decline, while the Amazonas had a 42% decline and Para saw an increase of 13%.

It's worth noting that ivermectin's effectiveness appears largely unaffected by variants, meaning it has worked on any and all variants that have so far popped up around the world. Additional evidence for ivermectin will hopefully come from the British PRINCIPLE trial, [29] which began June 23, 2021. Ivermectin will be evaluated as an outpatient treatment in this study, which will be the largest clinical trial to date.

YOUTUBE VIDEO LINK:
https://www.youtube.com/watch?v=ZCYM2HW2Ayw

The FLCCC believes ivermectin may also be an important treatment adjunct for long-haul COVID syndrome. In their June 16, 2021, video update, the team reviewed the newly released I-RECOVER protocol.

Keep in mind that ivermectin is not to be used in isolation. Corticosteroids, for example, are often a crucial treatment component when organizing pneumonia-related lung damage is present. Vitamin C is also important to combat inflammation. Be sure to work with your doctor to identify the right combination of drugs and supplements for you.

Last but not least, as noted by Kory in this video, it's really important to realize that long-haul syndrome is entirely preventable. The key is early treatment when you develop symptoms of COVID-19.

While ivermectin has a good track record when it comes to prevention and early treatment, it can be tricky to obtain, depending on where you live and who your doctor is.

A highly effective alternative that anyone can use, anywhere, is nebulized hydrogen peroxide. It's extremely safe and very inexpensive. The biggest cost is the one-time purchase of a good tabletop jet nebulizer. To learn more, download Dr. Thomas Levy's free e-book, "Rapid Virus Recovery," in which he details how to use this treatment.

The National Vaccine Information Center (NVIC) recently posted more than 50 video presentations from the pay-for-view Fifth International Public Conference on Vaccination held online October 16 to 18, 2020, and made them available to everyone for free.

The conference's theme was "Protecting Health and Autonomy in the 21st Century" and it featured physicians, scientists and other health professionals, human rights activists, faith community leaders, constitutional and civil rights attorneys, authors and parents of vaccine injured children talking about vaccine science, policy, law and ethics and infectious

diseases, including coronavirus and COVID-19 vaccines.

In December 2020, a U.K. company published false and misleading information about NVIC and its conference, which prompted NVIC to open up the whole conference for free viewing. The conference has everything you need to educate yourself and protect your personal freedoms and liberties with respect to your health and is a total of 50 short videos by doctors and lawyers alike who care about your health and the future of humanity.

Watch the Conference:
https://www.protectinghealthandautonomyinthe21stcentury.com/conference-live

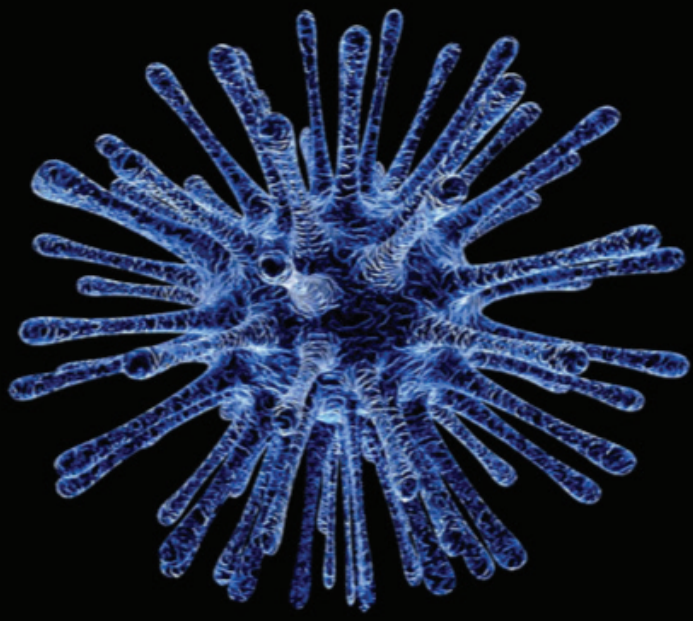
Sources & References

1 Antiviral Research June 2020; 178: 104787
2 Evidence-Based Medicine Consultancy Ltd.
3 Trial Site News April 9, 2021
4 Ivermectin for COVID Conference
5 Ivermectin for COVID Conference Speakers List
6 Bird-group.org Conference videos
7 Evidence-Based Medicine Consultancy Ltd. Rapid Review and Meta-Analysis January 3, 2021 (PDF)
8 American Journal of Therapeutics June 17, 2021 [Epub ahead of print]
9 WHO Therapeutics and COVID-19: Living Guideline March 31, 2021
10 WHO March 31, 2021
11 The Blaze April 1, 2021
12 FLCCC Alliance
13 Trial Site News May 30, 2021
14 Taibbi Substack June 19, 2021
15, 16, 17 Biz News May 12, 2021
18 Merck Statement on Ivermectin Use During COVID Pandemic February 4, 2021
19, 21 FLCCC December 8, 2020
20 Medpage Today January 6, 2021
22 FLCCC January 7, 2021 Press Release (PDF)
23 Newswise December 8, 2020
24 FLCCC Alliance I-MASK+ Protocol
25 FLCCC MATH+ Hospital Protocol
26 Journal of Intensive Care Medicine December 15, 2020 DOI: 10.1177/0885066620973585
27 FLCCC I-RECOVER protocol
28 American Journal of Therapeutics May/June 2021; Volume 28(3): e299-e318
29 Principletrial.org

# The SPARS Pandemic

## 2025 - 2028

A Futuristic Scenario for Public Health Risk Communicators



The Johns Hopkins Center for Health Security

# Project Team


**Monica Schoch-Spana, PhD**
Senior Associate
Johns Hopkins Center for Health Security

**Matthew P. Shearer, MPH**
Senior Analyst
Johns Hopkins Center for Health Security

**Emily K. Brunson, PhD, MPH**
Associate Professor
Texas State University

**Sanjana Ravi, MPH**
Senior Analyst
Johns Hopkins Center for Health Security

**Tara Kirk Sell, PhD, MA**
Senior Associate
Johns Hopkins Center for Health Security

**Hannah Chandler**
MPH Candidate
Columbia University

**Gigi Kwik Gronvall, PhD**
Senior Associate
Johns Hopkins Center for Health Security



## Recommended Citation

Schoch-Spana M, Brunson EK, Shearer MP, Ravi S, Sell TK, Chandler H, Gronvall GK. The SPARS Pandemic, 2025-2028: A Futuristic Scenario for Public Health Risk Communicators. Baltimore, MD: Johns Hopkins Center for Health Security; October 2017.


JOHNS HOPKINS
BLOOMBERG SCHOOL
*of* PUBLIC HEALTH

**Center for Health Security**

# Table of Contents

## Preface

A Possible Future in 2025: The "Echo Chamber"....1

## Response

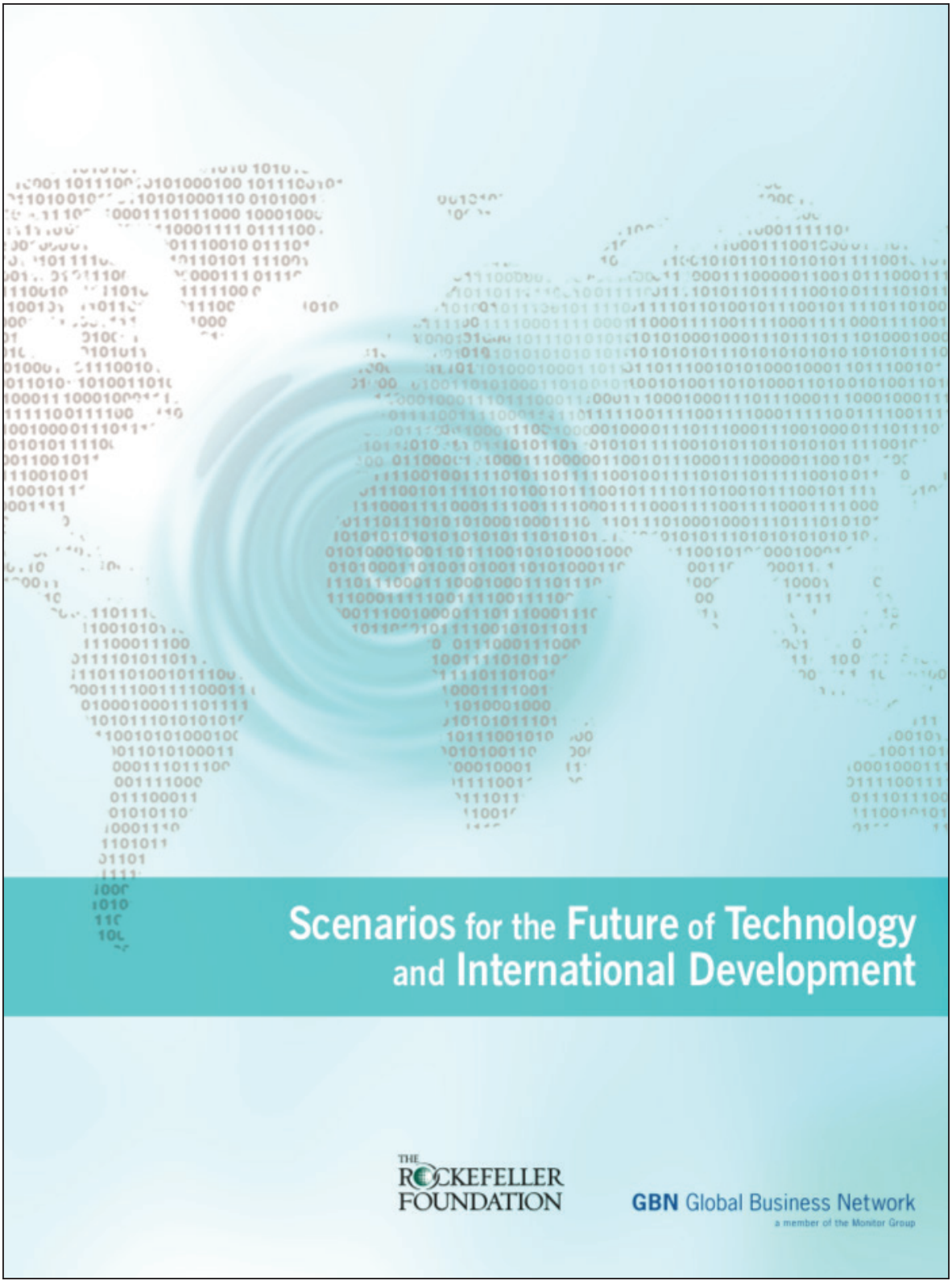
Chapter One: The SPARS Outbreak Begins....4
Chapter Two: A Possible Cure....8
Chapter Three: A Potential Vaccine....11
Chapter Four: Users Beware....14
Chapter Five: Going Viral....19
Chapter Six: The Grass is Always Greener....23
Chapter Seven: The Voice....25
Chapter Eight: Are You Talking To Me?....29
Chapter Nine: Changing Horses Midstream....31
Chapter Ten: Head of the Line Privileges....34
Chapter Eleven: Standing in Line, Protesting Online....37
Chapter Twelve: Don't Put All Your Eggs in One Basket....40
Chapter Thirteen: Lovers and Haters....43
Chapter Fourteen: The Grass is Always Greener, Part II....49
Chapter Fifteen: Are You Talking to Me, Part II....52
Chapter Sixteen: Antibiotics, HO!....55

## Recovery

Chapter Seventeen: Vaccine Injury....59
Chapter Eighteen: Acknowledging Loss....63
Chapter Nineteen: SPARS Aftermath....66

## References & Appendices

References....67
Acronyms....68
Appendix A: Response Scenario Timeline....69
Appendix B: Response Scenario Communication Dilemmas....73
Appendix C: Recovery Scenario Timeline....75
Appendix D: Recovery Scenario Communication Dilemmas....76


Scenarios for the Future of Technology and International Development
THE ROCKEFELLER FOUNDATION
GBN Global Business Network
a member of the Monitor Group

# LOCK STEP

A world of tighter top-down government control and more authoritarian leadership, with limited innovation and growing citizen pushback

In 2012, the pandemic that the world had been anticipating for years finally hit. Unlike 2009's H1N1, this new influenza strain—originating from wild geese—was extremely virulent and deadly. Even the most pandemic-prepared nations were quickly overwhelmed when the virus streaked around the world, infecting nearly 20 percent of the global population and killing 8 million in just seven months, the majority of them healthy young adults. The pandemic also had a deadly effect on economies: international mobility of both people and goods screeched to a halt, debilitating industries like tourism and breaking global supply chains. Even locally, normally bustling shops and office buildings sat empty for months, devoid of both employees and customers.

The pandemic blanketed the planet—though disproportionate numbers died in Africa, Southeast Asia, and Central America, where the virus spread like wildfire in the absence of official containment protocols. But even in developed countries, containment was a challenge. The United States's initial policy of "strongly discouraging" citizens from flying proved deadly in its leniency, accelerating the spread of the virus not just within the U.S. but across borders. However, a few countries did fare better—China in particular. The Chinese government's quick imposition and enforcement of mandatory quarantine for all citizens, as well as its instant and near-hermetic sealing off of all borders, saved millions of lives, stopping the spread of the virus.

China's government was not the only one that took extreme measures to protect its citizens from risk and exposure. During the pandemic, national leaders around the world flexed their authority and imposed airtight rules and restrictions, from the mandatory wearing of face masks to body-temperature checks at the entries to communal spaces like train stations and supermarkets. Even after the pandemic faded, this more authoritarian control and oversight of citizens and their activities stuck and even intensified. In order to protect themselves from the spread of increasingly global problems—from pandemics and transnational terrorism to environmental crises and rising poverty—leaders around the world took a firmer grip on power.

At first, the notion of a more controlled world gained wide acceptance and approval. Citizens willingly gave up some of their sovereignty—and their privacy—to more paternalistic states in exchange for greater safety and stability. Citizens were more tolerant, and even eager, for top-down direction and oversight, and national leaders had more latitude

to impose order in the ways they saw fit. In developed countries, this heightened oversight took many forms: biometric IDs for all citizens, for example, and tighter regulation of key industries whose stability was deemed vital to national interests. In many developed countries, enforced cooperation with a suite of new regulations and agreements slowly but steadily restored both order and, importantly, economic growth.
Across the developing world, however, the story was different—and much more variable. Top-down authority took different forms in different countries, hinging largely on the capacity, caliber, and intentions of their leaders. In countries with strong and thoughtful leaders, citizens' overall economic status and quality of life increased. In India, for example, air quality drastically improved after 2016, when the government outlawed high- emitting vehicles. In Ghana, the introduction of ambitious government programs to improve basic infrastructure and ensure the availability of clean water for all her people led to a sharp decline in water-borne diseases.

But more authoritarian leadership worked less well—and in some cases tragically—in countries run by irresponsible elites who used their increased power to pursue their own interests at the expense of their citizens. There were other downsides, as the rise of virulent nationalism created new hazards: spectators at the 2018 World Cup, for example, he virus far earlier than in other countries and enabling a swifter post- pandemic recovery.

Some wore bulletproof vests that sported a patch of their national flag. Strong technology regulations stifled innovation, kept costs high, and curbed adoption. In the developing world, access to "approved" technologies increased but beyond that remained limited: the locus of technology innovation was largely in the developed world, leaving many developing countries on the receiving end of technologies that others consider "best" for them.

"***IT IS POSSIBLE TO DISCIPLINE AND CONTROL SOME SOCIETIES FOR SOME TIME, BUT NOT THE WHOLE WORLD ALL THE TIME***."'

~ GK Bhat, TARU Leading Edge, India

governments found this patronizing and refused to distribute computers and other technologies that they scoffed at as "second hand." Meanwhile, developing countries with more resources and better capacity began to innovate internally to fill these gaps on their own.

Meanwhile, in the developed world, the presence of so many top-down rules and norms greatly inhibited entrepreneurial activity. Scientists and innovators were often told by governments what research lines to pursue and were guided mostly toward projects that would make money (e.g., market-driven product development) or were "sure bets" (e.g., fundamental research), leaving more risky or innovative research areas largely untapped.

Well-off countries and monopolistic companies with big research and development budgets still made significant advances, but the IP behind their breakthroughs remained locked behind strict national or corporate protection.

Russia and India imposed stringent domestic standards for supervising and certifying encryption-related products and their suppliers—a category that in reality meant all IT innovations.

The U.S. and EU struck back with retaliatory national standards, throwing a wrench in the development and diffusion of technology globally. Especially in the developing world, acting in one's national self-interest often meant seeking practical alliances that fit with those interests—whether it was gaining access to needed resources or banding together in order to achieve economic growth. In South America and Africa, regional and sub-regional alliances became more structured. Kenya doubled its trade with southern and eastern Africa, as new partnerships grew within the continent. China's investment in Africa expanded as the bargain of new jobs and infrastructure in exchange for access to key minerals or food exports proved agreeable to many governments. Cross-border ties proliferated in the form of official security aid. While the deployment of foreign security teams was welcomed in some of the most dire failed states, one-size-fits-all solutions yielded few positive results.
By 2025, people seemed to be growing weary of so much top-down control and letting leaders and authorities make choices for them.

Wherever national interests clashed with individual interests, there was conflict. Sporadic pushback became increasingly organized and coordinated, as disaffected youth and people who had seen their status and opportunities slip away—largely in developing countries—incited civil unrest. In 2026, protestors in Nigeria brought down the government, fed up with the entrenched cronyism and corruption.

Even those who liked the greater stability and predictability of this world began to grow uncomfortable and constrained by so many tight rules and by the strictness of national boundaries. The feeling lingered that sooner or later, something would inevitably upset the neat order that the world's governments had worked so hard to establish.

## ROLE OF PHILANTHROPY IN LOCK STEP

Philanthropic organizations will face hard choices in this world. Given the strong role of governments, doing philanthropy will require heightened diplomacy skills and the ability to operate effectively in extremely divergent environments. Philanthropy grantee and civil society relationships will be strongly moderated by government, and some foundations might choose to align themselves more closely with national official development assistance (ODA) strategies and government objectives. Larger philanthropies will retain an outsized share of influence, and many smaller philanthropies may find value in merging financial, human, and operational resources.

Philanthropic organizations interested in promoting universal rights and freedoms will get blocked at many nations' borders. Developing smart, flexible, and wide-ranging relationships in this world will be key; some philanthropies may choose to work only in places where their skills and services don't meet resistance. Many governments will place severe restrictions on the program areas and geographies that international philanthropies can work in, leading to a narrower and stronger geographic focus or grant-making in their home country only.

The American Jounal Of Medicine • 2021

# Pathophysiological Basis and Rationale for Early Outpatient Treatment of SARS-CoV-2 (COVID-19) Infection

Peter A. McCullough, MD, MPH,a,b,c Ronan J. Kelly, MD,a Gaetano Ruocco, MD,d Edgar Lerma, MD,e James Tumlin, MD,f Kevin R. Wheelan, MD,a,b,c Nevin Katz, MD,g Norman E. Lepor, MD,h Kris Vijay, MD,i Harvey Carter, MD,j Bhupinder Singh, MD,k Sean P. McCullough, BS,l Brijesh K. Bhambi, MD,m Alberto Palazzuoli, MD, PhD,n

Gaetano M. De Ferrari, MD, PhD,o Gregory P. Milligan, MD, MPH,a Taimur Safder, MD, MPH,a Kristen M. Tecson, PhD,b Dee Dee Wang, MD,p John E. McKinnon, MD,p William W. O'Neill, MD,p Marcus Zervos, MD,p Harvey A. Risch, MD, PhDq aBaylor University Medical Center, Dallas, Tex; bBaylor Heart and Vascular Institute, Dallas, Tex; cBaylor Jack and Jane Hamilton Heart and Vascular Hospital, Dallas, Tex; dCardiology Division, Regina Montis Regalis Hospital, Mondov170ı, Cuneo, Italy; eChrist Advocate Medical Center, Chicago, Ill; fEmory University School of Medicine, Atlanta, Ga; gJohns Hopkins School of Medicine, Baltimore, Md; hCedars Sinai Medical Center, Los Angeles, Calif; iAbrazo Arizona Heart Hospital, Abrazo Health System, Phoenix, Ariz; jCarter Eye Center, Dallas, Tex; kCardiorenal Society of America, Phoenix, Ariz; lUniversity of Texas McGovern Medical School, Houston, Tex; mBakersfield Heart Hospital, Bakersfield, Calif; nUniversity of Siena, Le Scotte Hospital Viale Bracci, Siena, Italy; oUniversity of Torino, Torino, Italy; pHenry Ford Hospital, Detroit, Mich; qYale University School of Public Health, New Haven, Conn.

ABSRACT

Approximately 9 months of the severe acute respiratory syndrome coronavius-2 (SARS-CoV-2 [COVID- 19]) spreading across the globe has led to widespread COVID-19 acute hospitalizations and death. The rapidity and highly communicable nature of the SARS-CoV-2 outbreak has hampered the design and execution of definitive randomized, controlled trials of therapy outside of the clinic or hospital. In the absence of clinical trial results, physicians must use what has been learned about the pathophysiology of SARS- CoV-2 infection in determining early outpatient treatment of the illness with the aim of preventing hospitalization or death. This article outlines key pathophysiological principles that relate to the patient with early infection treated at home.

Therapeutic approaches based on these principles include 1) reduction of reinoculation, 2) combination antiviral therapy, 3) immunomodulation, 4) antiplatelet/antithrombotic ther- apy, and 5) administration of oxygen, monitoring, and telemedicine. Future random-

ized trials testing the principles and agents discussed will undoubtedly refine and clarify their individual roles; however, we emphasize the immediate need for management guidance in the setting of widespread hospital resource consumption, morbidity, and mortality.

The pandemic of severe acute respiratory syndrome corona- virus-2 (SARS-CoV-2 [COVID-19]) is rapidly expanding across the world with each country and region developing distinct epidemiologic patterns in terms of frequency, hospitalization, and death. There has been considerable focus on 2 major areas of response to the pandemic: containment of the spread of infection and reducing inpatient mortality.

These efforts, although well-justified, have not addressed the ambulatory patient with COVID-19 who is at risk for hospitalization and death. The current epidemiology of rising COVID-19 hospitalizations serves as a strong impetus for an attempt at treatment in the days or weeks before a hospitalization occurs.1 Most patients who arrive to the hospital by emergency medical serv-
ices with COVID-19 do not initially require forms of advanced medical care.2 Once hospitalized, approximately 25% require mechanical ventilation, advanced circulatory support, or renal replacement therapy. Hence, it is conceivable that some, if not a majority, of hospitalizations could be avoided with a treat-at-home first approach with appropriate telemedicine monitor- ing and access to oxygen and therapeutics.3

As in all areas of medicine, the large randomized, placebo-controlled, parallel group clinical trial
in appropriate patients at risk with meaningful outcomes is the theoretical gold standard for recommending therapy. These standards are not sufficiently rapid or responsive to the COVID-19 pandemic.4

One could argue the results of definitive trials were needed at the outset of the pandemic, and certainly are needed now with more than 1 million cases and 500,000 deaths worldwide.5 Because COVID-19 is highly communicable, many ambulatory clinics do not care for patients in face-to-face visits, and these patients are commonly declined by pharmacies, laboratories, and imaging centers. On May 14th, 2020, after about 1 million cases and 90,000 deaths in the United States had already occurred, the National Institutes of Health (NIH) announced it was launching an outpatient trial of hydroxychloroquine (HCQ) and azithromycin in the treatment of COVID-19.6 A month later, the agency announced it was closing the trial because of the lack of enrollment with only 20 of 2000 patients recruited.7 No safety concerns were associated with the trial. This effort serves as the best current working example of the lack of feasibility of outpatient trials for COVID-19. It is also a strong signal that future ambulatory trial results are not imminent or likely to report soon enough to have a significant public health impact on clinical outcomes.8

If clinical trials are not feasible or will not deliver timely guidance to clinicians or patients, then other scientific information bearing on medication efficacy and safety needs to be examined. Cited in this article are more than a dozen studies of various designs that have examined a range of existing medications. Thus, in the context of present knowledge, given the severity of the outcomes and the relative availability, cost, and toxicity of the therapy, each physician and patient must make a choice: watchful waiting in self-quarantine or empiric treatment with the aim of reducing hospitalization and death. Because COVID-19 expresses a wide spectrum of illness progressing from asymptomatic to symptomatic infection to fulminant adult respiratory distress syndrome and multiorgan system failure, there is a need to individualize therapy according to what has been learned about the pathophysiology of human SARS- CoV-2 infection.9 It is beyond the scope of this article to review every preclinical and retrospective study of proposed COVID-19 therapy. Hence, the agents proposed are those that have appreciable clinical support and are feasible for administration in the ambulatory setting. SARS-CoV-2 as with many infections may be amenable to therapy early in its course but is probably not responsive to the same treatments very late in the hospitalized and terminal stages of illness.10

For the ambulatory patient with recognized early signs and symptoms of COVID-19, often with nasal real-time reverse transcription or oral antigen testing pending, the following 4 principles could be deployed in a layered and escalating manner depending on clinical manifestations of COVID-19-like illness11 and confirmed infection: 1) reduction of reinoculation, 2) combination antiviral therapy, 3) immunomodulation, and 4) antiplatelet/antithrombotic therapy. Because the results of testing could take up to a week to return, treatment can be started before the results are known. For patients with cardinal features of the syndrome (ie, fever, body aches, nasal congestion, loss of taste and smell, etc.) and suspected false-negative testing, treatment can be the same as those with confirmed COVID-19.11 Future randomized trials are expected to confirm, reject, refine, and expand these principles. In this article, they are set forth in emergency response to the growing pandemic as shown in Figure 1.

## CONTROL OF CONTAGION

A major goal of self-quarantine is the control of contagion.12 Many sources of information suggest the main place of viral transmission occurs in the home.13 Facial covering for all contacts within the home as well as frequent use of hand sanitizer and hand washing is mandatory. Sterilizing surfaces such as countertops, door handles, phones, and other devices is advised. When possible, other close contacts can move out of the domicile and temporarily stay with others not ill with SARS-CoV-2. Findings from multiple studies indicate that policies concerning control of the spread of SARS-CoV-2 are effective and extension into the home as the most frequent site of viral transfer is paramount.14

## REDUCTION OF SELF-REINOCULATION

It is well-recognized that COVID-19 exists outside the human body in a bioaerosol of airborne particles and droplets. Because exhaled air in an infected person is considered to be "loaded" with inoculum, each exhalation and inhalation is effectively reinoculation.15 In patients who are hospitalized, negative pressure is applied to the room air largely to reduce spread outside of the room. We propose that fresh air could reduce reinoculation and potentially reduce the severity of illness and possibly reduce household spread during quarantine. This calls for open windows, fans for aeration, or spending long periods of time outdoors away from others with no face covering to disperse and not reinhale the viral bioaerosol.

## COMBINATION ANTIVIRAL THERAPY

Rapid and amplified viral replication is the hallmark of most acute viral infections. By reducing the rate, quantity, or duration of viral replication, the degree of direct viral injury to the respiratory epithelium, vasculature, and organs may be lessened.16 Additionally, secondary processes that depend on viral stimulation, including the activation of inflammatory cells, cytokines, and coagulation, could potentially be lessened if viral replication is attenuated. Because no form of readily available medication has been designed specifically to inhibit SARS-CoV-2 replication, 2 or more of the nonspecific agents listed here can be entertained. None of the approaches listed have specific regulatory approved advertising labels for their manufacturers; thus all would be appropriately considered acceptable "off- label" use.17

### Zinc Lozenges and Zinc Sulfate

Zinc is a known inhibitor of coronavirus replication. Clinical trials of zinc lozenges in the common cold have demonstrated modest reductions in the duration and or severity of symptoms.18 By extension, this readily available nontoxic therapy could be deployed at the first signs of COVID-19.19 Zinc lozenges can be administered 5 times a day for up to 5 days and extended if needed if symptoms persist. The amount of elemental zinc lozenges is <25% of that in a single 220-mg zinc sulfate daily tablet. This dose of zinc sulfate has been effectively used in combination with antimalarials in early treatment of high-risk outpatients with COVID-19.20

### Antimalarials

Hydroxychloroquine (HCQ) is an antimalarial/anti-inflammatory drug that impairs endosomal transfer of virions within human cells. HCQ is also a zinc ionophore that conveys zinc intracellularly to block the SARS-CoV-2 RNA-dependent RNA polymerase, which is

the core enzyme of the virus replication.21 The currently completed retrospective studies and randomized trials have generally shown these findings: 1) when started late in the hospital course and for short durations of time, antimalarials appear to be ineffective, 2) when started earlier in the hospital course, for progressively longer durations and in outpatients, antimalarials may reduce the progression of disease, prevent hospitalization, and are associated with reduced mortality.22–25 In a retrospective inpatient study of 2541 patients hospitalized with COVID-19, therapy associated with an adjusted reduction in mortality was HCQ alone (hazard ratio [HR] = 0.34, 95% confidence interval [CI] 0.25-0.46, P <0.001) and HCQ with azithromycin (HR = 0.29, 95% CI 0.22-0.40, P <0.001).23 HCQ was approved by the US Food and Drug Administration in 1955, has been used by hundreds of millions of people worldwide since then, is sold over the counter in many countries, and has a well-characterized safety profile that should not raise undue alarm.25,26 Although asymptomatic QT prolongation is a well-recognized and infrequent (<1%) complication of HCQ, it is possible that in the setting of acute illness symptomatic arrhythmias could develop. Data safety and monitoring boards have not declared safety con- cerns in any clinical trial published to date. Rare patients with a personal or family history of prolonged QT syn- drome and those on additional QT prolonging, contraindicated drugs (eg, dofetilide, sotalol) should be treated with caution and a plan to monitor the QTc in the ambulatory setting. A typical HCQ regimen is 200 mg bid for 5 days and extended to 30 days for continued symptoms. A mini-mal sufficient dose of HCQ should be used, because in excessive doses the drug can interfere with early immune response to the virus.

## Azithromycin

Azithromycin is a commonly used macrolide antibiotic that has antiviral properties mainly attributed to reduced endosomal transfer of virions as well as established anti-inflammatory effects.27 It has been commonly used in COVID-19 studies initially based on French reports demonstrating markedly reduced durations of viral shedding, fewer hospitalizations, and reduced mortality combination with HCQ as compared to those untreated.28,29 In the large inpatient study (n = 2451) discussed previously, those who received azithromycin alone had an adjusted HR for mortality of 1.05, 95% CI 0.68-1.62, and P = 0.83.23 The combination of HCQ and azithromycin has been used as standard of care in other contexts as a standard of care in more than 300,000 older adults with multiple comorbidities.30 This agent is well-tolerated and like HCQ can prolong the QTc in <1% of patients. The same safety precautions for HCQ listed previously could be extended to azithromycin with or without HCQ. Azithromycin provides additional coverage of bacterial upper respiratory pathogens that could potentially play a role in concurrent or secondary infection. Thus, this agent can serve as a safety net for patients with COVID-19 against clinical failure of the bacterial component of community-acquired pneumonia.31,32 The same safety precautions for HCQ could be extended to azithromycin with or without HCQ. Because both HCQ and azithromycin have small but potentially additive risks of QTc prolongation,

patients with known or suspected arrhythmias or taking contraindicated medications or should have more thorough workup (eg, review of baseline electrocardiogram, imaging studies, etc.) before receiving these 2 together. One of many dosing schemes is 250 mg po bid for 5 days and may extend to 30 days for persistent symptoms or evidence of bacterial superinfection.

### Doxycycline

Doxycycline is another common antibiotic with multiple intracellular effects that may reduce viral replication, cellular damage, and expression of inflammatory factors.33,34 This drug has no effect on cardiac conduction and has the main caveat of gastrointestinal upset and esophagitis. As with azithromycin, doxycycline has the advantage of offering antibacterial coverage for superimposed bacterial infection in the upper respiratory tract. Doxycycline has a high degree of activity against many common respiratory pathogens including Streptococcus pneumoniae, Haemophilus influenzae, Moraxella catarrhalis, anaerobes such as Bac- teroides and anaerobic/microaerophilic streptococci and atypical agents like Legionella, Mycoplasma pneumoniae, and Chlamydia pneumoniae.34 One of many dosing schemes is 200 mg po followed by 100 mg po bid for 5 days and may extend to 30 days for persistent symptoms or evidence of bacterial superinfection. Doxycycline may be useful with HCQ for patients in whom the HCQ-azithro- mycin combination is not desired.

### Favipiravir

Favipiravir, an oral selective inhibitor of RNA-dependent RNA polymerase, is approved for ambulatory use in COVID-19 in Russia, India, and other countries outside of the United States.35 It has been previously used for treatment of some life-threatening infections such as Ebola virus, Lassa virus, and rabies. Its therapeutic efficacy has been proven in these diseases.36 Like, the antimalarials and antibiotics, favipiravir has no large-scale randomized trials completed at this time, given the short time frame of the pandemic. A dose administration could be 1600 mg po bid on day 1, following by 600 mg po bid for 14 days.37

## IMMUNOMODULATORS

The manifestations of COVID-19 that prompt hospitalization and that may well lead to multiorgan system failure are attributed to a cytokine storm. The characteristic profile of a patient acutely ill with COVID-19 includes leukocytosis with a relative neutropenia. These patients have higher serum level of cytokines (ie, TNF-a, IFN-g, IL-1b, IL-2, IL-4, IL-6, and IL-10) and C-reactive protein than control individuals. Among patients with COVID-19, serum IL-6 and IL-10 levels appear even more elevated in the critically ill.38 As with any acute inflammatory state, early treatment with immunomodulators is expected to impart

greater benefit. In COVID-19, some of the first respiratory findings are nasal congestion, cough, and wheezing. These features are due to excess inflammation and cytokine activation. Early use of corticosteroids is a rational intervention for patients with COVID-19 with these features as they would be in acute asthma or reactive airways disease.39,40 The RECOVERY trial randomized 6425 hospitalized patients with COVID-19 in a 2:1 ratio to dexamethasone 6 mg po/IV daily for up to 10 days and found dexamethasone reduced mortality (HR = 0.65, 95% CI 0.51-0.82, P <0.001).41 One potential dosing scheme for outpatients starting on day 5 or the onset of respiratory symptoms is prednisone 1 mg/kg given daily for 5 days with or without a subsequent taper.

## Colchicine

Colchicine is a nonsteroidal antimitotic drug that blocks metaphase by binding to the ends of microtubules to prevent the elongation of the microtubule polymer. This agent has proven useful in gout and idiopathic recurrent pericarditis. The GRECCO-19 randomized open-label trial in 105 hospitalized patients with COVID-19 found that colchicine was associated with a reduction in D-dimer levels and improved clinical outcomes.42 The clinical primary end point (2-point change in World Health Organization ordinal scale) occurred in 14.0% in the control group (7 of 50 patients) and 1.8% in the colchicine group (1 of 55 patients) (odds ratio, 0.11; 95% CI, 0.01-0.96; P = 0.02).43 Because the short-term safety profile is well understood, it is reasonable to consider this agent along with corticosteroids in an attempt to reduce the effects of cytokine storm. A dosing scheme of 1.2 mg po, followed by 0.6 mg po bid for 3 weeks can be considered.

## ANTIPLATELET AGENTS AND ANTITHROMBOTICS

Multiple studies have described increased rates of pathological macro- and micro-thrombosis.44,45 Patients with COVID-19 have described chest heaviness associated with desaturation that suggests the possibility of pulmonary thrombosis.46 Multiple reports have described elevated D-dimer levels in acutely ill patients with COVID-19, which has been consistently associated with increased risk of deep venous thrombosis and pulmonary embolism.47–49 Nec- ropsy studies have described pulmonary microthrombosis in COVID-19.50 These observations support the notion that endothelial injury and thrombosis play a role in oxygen desaturation, a cardinal reason for hospitalization and supportive care.47 Based on this pathophysiologic rationale, aspirin 81 mg daily can be administered as an initial antiplatelet and anti-inflammatory agent.51,52 Ambulatory patients can be additionally treated with subcutaneous low-molecular-weight heparin or with short-acting novel anticoagulant drugs in dosing schemes similar to those used in outpatient thromboprophylaxis. In a retrospective study of 2773 inpatients with COVID-19, 28% received anticoagulant therapy within 2 days of admission, and despite being used in more severe cases, anticoagulant administration was associated with a reduction in mortality

(HR = 0.86 per day of therapy, 95% CI: 0.82-0.89; P <0.001). Additional supportive data on the use anticoagulants reducing mortality has been reported in hospitalized patients with elevated D-dimer levels and higher comorbidity scores.53 Many acutely ill outpatients also have general indications for venous thromboembolism prophylaxis applicable to COVID-19.54

## DELIVERY OF OXYGEN AND MONITORING

Because ambulatory centers and clinics have been reticent to have face-to-face visits with patients with COVID-19, telemedicine is a reasonable platform for monitoring. Clinical impressions can be gained with audio and video interviews by the physician with the patient. Supplemental information, including vital signs and symptoms, will be important to guide the physician. A significant component of safe outpatient management is maintenance of arterial oxygen saturation on room air or prescribed home oxygen under direct supervision by daily telemedicine with escalation to hospitalization for assisted ventilation if needed. Self-proning could be entertained for confident patients with good at-home monitoring.55

Many of the measures discussed in this article could be extended to seniors in COVID-19 treatment units in nursing homes and other nonhospital settings. This would leave the purposes of hospitalization to the administration of intravenous fluid and parenteral medication, assisted pressure or mechanical ventilation, and advanced mechanical circulatory support.

## SUMMARY

Acute COVID-19 has a great range of clinical severity from asymptomatic to fatal. In the absence of clinical trials and guidelines, with hospitalizations and mortality mounting, it is prudent to deploy treatment for COVID-19 based on pathophysiological principles. We have proposed an algorithm based on age and comorbidities that allows for a large proportion to be monitored and treated at home during self-isolation with the aim of reducing the risks of hospitalization and death.

## References

1. McCullough PA, Eidt J, Rangaswami J, et al. Urgent need for individ- ual mobile phone and institutional reporting of at home, hospitalized, and intensive care unit cases of SARS-CoV-2 (COVID-19) infection. Rev Cardiovasc Med 2020;21(1):1–7. https://doi.org/10.31083/j.rcm. 2020.01.42.
2. Yang BY, Barnard LM, Emert JM, et al. Clinical characteristics of patients with coronavirus disease 2019 (COVID-19) receiving emer- gency medical services in King County, Washington. JAMA Netw Open 2020;3(7):e2014549. https://doi.org/10.1001/jamanetworkopen.
2020.14549.

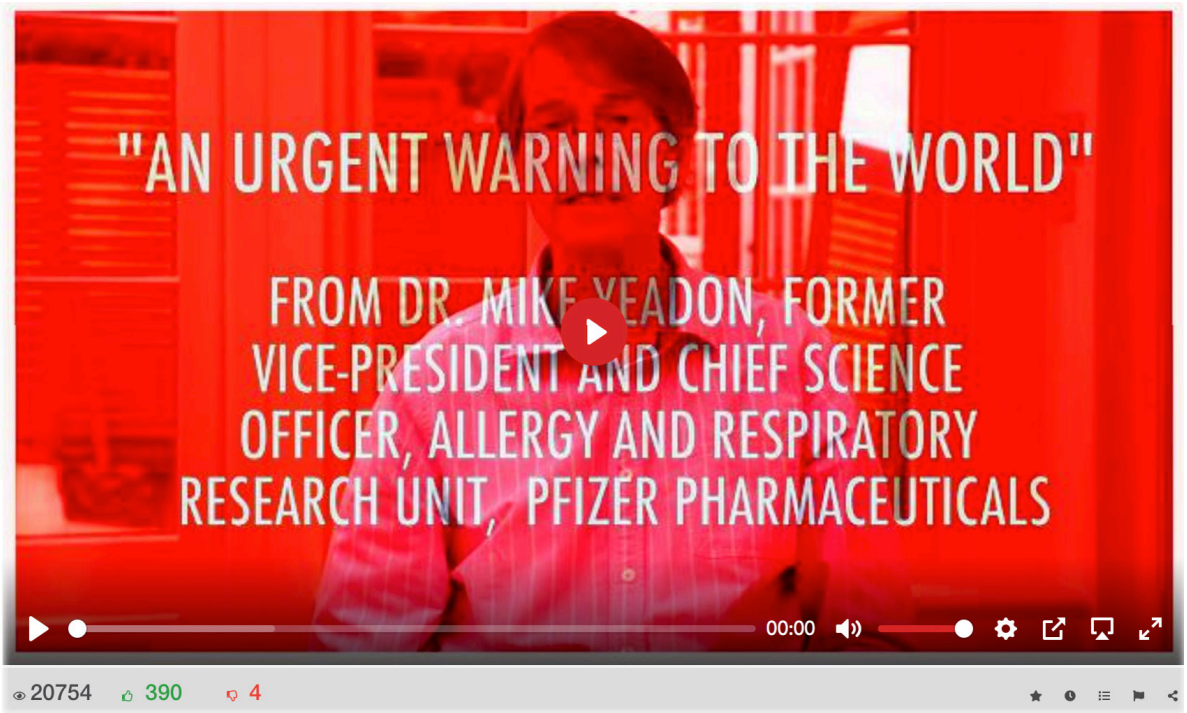
3. Argenziano MG, Bruce SL, Slater CL, et al. Characterization and clin-
ical course of 1000 patients with coronavirus disease 2019 in New York: retrospective case series. BMJ 2020;369:m1996. https://doi.org/ 10.1136/bmj.m1996.
4. Severe outcomes among patients with coronavirus disease 2019 (COVID-19) — United States, February 12–March 16, 2020. MMWR Morb Mortal Wkly Rep 2020;69(12):343–6. https://doi.org/10.15585/ mmwr.mm6912e2.
5. WorldoMeter. COVID-19 coronavirus pandemic. Available at: https:// www.worldometers.info/coronavirus/. Accessed July 3, 2020.
6. National Institutes of Health. NIH begins clinical trial of hydroxy- chloroquine and azithromycin to treat COVID-19. Available at: https://www.nih.gov/news-events/news-releases/nih-begins-clinical- trial-hydroxychloroquine-azithromycin-treat-covid-19. Accessed July 3, 2020.
7. National Institute of Allergy and Infectious Diseases. NIH clinical trial evaluating hydroxychloroquine and azithromycin to treat COVID-19 closes early. Available at: https://www.niaid.nih.gov/news-events/bul- letin-nih-clinical-trial-evaluating-hydroxychloroquine-and-azithromy- cin-covid-19. Accessed July 3, 2020.
8. National Institutes of Health/US National Library of Medicine. COVID-19 studies from the World Health Organization database. Available at: https://clinicaltrials.gov/ct2/who_table. Accessed July 3, 2020.
9. Gopalakrishnan A, Mossaid A, Lo KB, Vasudevan V, McCullough PA, Rangaswami J. Fulminant acute kidney injury in a young patient with novel coronavirus 2019. Cardiorenal Med 2020;10(4):217–22. https://doi.org/10.1159/000508179.
10. Vaduganathan M, van Meijgaard J, Mehra MR, Joseph J, O'Donnell CJ, Warraich HJ. Prescription fill patterns for commonly used drugs during the COVID-19 pandemic in the United States. JAMA 2020;323 (24):2524–6. https://doi.org/10.1001/jama.2020.9184.
TaggedP11. Centers for Disease Control and Prevention. Available at: https:// www.cdc.gov/coronavirus/2019-ncov/covid-data/ccovidview/ 05152020/covid-like-illness.html. Accessed July 3, 2020.
12. Nussbaumer-Streit B, Mayr V, Dobrescu AI, et al. Quarantine alone or in combination with other public health measures to control COVID-19: a rapid review. Cochrane Database Syst Rev 2020;4(4): CD013574. https://doi.org/10.1002/14651858.CD013574 [Published 2020 Apr 8].
13. Xu XK, Liu XF, Wu Y, Ali ST, Du Z, Bosetti P, Lau EHY, Cowling BJ, Wang L. Reconstruction of Transmission Pairs for novel Corona- virus Disease 2019 (COVID-19) in mainland China: Estimation of Super-spreading Events, Serial Interval, and Hazard of Infection. Clin Infect Dis. 2020 Jun 18:ciaa790. doi: 10.1093/cid/ciaa790. Epub ahead of print. PMID: 32556265; PMCID: PMC7337632.
14. Hsiang S, Allen D, Annan-Phan S, et al. The effect of large-scale anti- contagion policies on the COVID-19 pandemic. Nature 2020;584 (7820):262–7. https://doi.org/10.1038/s41586-020-2404-8.
15. Chen LD. Effects of ambient temperature and humidity on droplet lifetime - A perspective of exhalation sneeze droplets with COVID-19 virus transmission. Int J Hyg Environ Health 2020;229:113568. https://doi.org/10.1016/j.ijheh.2020.113568.
16. Izzedine H, Jhaveri KD, Perazella MA. COVID-19 therapeutic options for patients with kidney disease. Kidney Int 2020;97(6):1297–8. https://doi.org/10.1016/j.kint.2020.03.015.
17. Shojaei A, Salari P. COVID-19 and off label use of drugs: an ethical viewpoint [published online ahead of print, 2020 May 8]. Daru. 2020;1-5. https://doi.org/10.1007/s40199-020-00351-y
18. Prasad AS, Fitzgerald JT, Bao B, Beck FW, Chandrasekar PH. Dura- tion of symptoms and plasma cytokine levels in patients with the com- mon cold treated with zinc acetate. A randomized, double-blind, placebo-controlled trial. Ann Intern Med 2000;133(4):245–52. https:// doi.org/10.7326/0003-4819-133-4-200008150-00006.
19. Rahman MT, Idid SZ. Can Zn Be a Critical Element in COVID-19 Treatment? [published online ahead of print, 2020 May 26]. Biol

Trace Elem Res. 2020;1-9. https://doi.org/10.1007/s12011-020-
02194-9
20. Zelenko V.Clinical dx protocol. Available at: https://docs.google.com/
document/d/1pjgHlqI-ZuKOziN3txQsN5zz62v3K043pR3DdhEmcos/
edit. Accessed July 3, 2020.
21. Te Velthuis AJ, van den Worm SH, Sims AC, Baric RS, Snijder EJ,
van Hemert MJ. Zn(2+) inhibits coronavirus and arterivirus RNA polymerase activity in vitro and zinc ionophores block the replication of these viruses in cell culture. PLoS Pathog 2010;6(11):e1001176. https://doi.org/10.1371/journal.ppat.1001176.
22. Rosenberg ES, Dufort EM, Udo T, et al. Association of treatment with hydroxychloroquine or azithromycin with in-hospital mortality in patients with COVID-19 in New York State. JAMA 2020;323 (24):2493–502. https://doi.org/10.1001/jama.2020.8630.
23. Arshad S, Kilgore P, Chaudhry ZS, et al. Treatment with hydroxy- chloroquine, azithromycin, and combination in patients hospitalized with COVID-19. Int J Infect Dis 2020;97:396–403. https://doi.org/ 10.1016/j.ijid.2020.06.099.
24. Mikami T, Miyashita H, Yamada T, et al. Risk Factors for Mortality in Patients with COVID-19 in New York City [published online ahead of print, 2020 Jun 30]. J Gen Intern Med. 2020;1-10. https://doi.org/ 10.1007/s11606-020-05983-z
25. Schrezenmeier E, D€orner T. Mechanisms of action of hydroxychloro- quine and chloroquine: implications for rheumatology. Nat Rev Rheu- matol 2020;16(3):155–66. https://doi.org/10.1038/s41584-020-0372-x.
26. US Food and Drug Administration. FDA cautions against use of hydroxychloroquine or chloroquine for COVID-19 outside of the hos- pital setting or a clinical trial due to risk of heart rhythm problems. Available at: https://www.fda.gov/drugs/drug-safety-and-availability/ fda-cautions-against-use-hydroxychloroquine-or-chloroquine-covid- 19-outside-hospital-setting-or. Accessed July 3 2020.
27. Pani A, Lauriola M, Romandini A, Scaglione F. Macrolides and viral infections: focus on azithromycin in COVID-19 pathology. Int J Anti- microbial Agents 2020;56(2):106053. https://doi.org/10.1016/j.ijanti- micag.2020.106053.
28. Lagier JC, Million M, Gautret P, et al. Outcomes of 3,737 COVID-19 patients treated with hydroxychloroquine/azithromycin and other regi- mens in Marseille, France: a retrospective analysis. Travel Med Infect Dis 2020;36:101791. https://doi.org/10.1016/j.tmaid.2020.101791.
29. Million M, Lagier JC, Gautret P, et al. Early treatment of COVID-19 patients with hydroxychloroquine and azithromycin: A retrospective analysis of 1061 cases in Marseille, France. Travel Med Infect Dis 2020;35:101738. https://doi.org/10.1016/j.tmaid.2020.101738.
30. Risch HA. Early outpatient treatment of symptomatic, high-risk covid- 19 patients that should be ramped-up immediately as key to the pan- demic crisis [e-pub ahead of print]. Am J Epidemiol. Accessed June 29, 2020. https://doi.org/10.1093/aje/kwaa093.
31. Eljaaly K, Alshehri S, Aljabri A, et al. Clinical failure with and with- out empiric atypical bacteria coverage in hospitalized adults with community-acquired pneumonia: a systematic review and meta-analy- sis. BMC Infect Dis 2017;17(1):385. https://doi.org/10.1186/s12879- 017-2495-5.
32. Malek AE, Granwehr BP, Kontoyiannis DP. Doxycycline as a poten- tial partner of COVID-19 therapies. IDCases 2020;21:e00864. https:// doi.org/10.1016/j.idcr.2020.e00864.
33. Sodhi M, Etminan M. therapeutic potential for tetracyclines in the treatment of COVID-19 pharmacotherapy. 2020;40(5):487-488. doi: 10.1002/phar.2395.
34. Ailani RK, Agastya G, Ailani RK, Mukunda BN, Shekar R. Doxycy- cline is a cost-effective therapy for hospitalized patients with commu- nity-acquired pneumonia. Arch Intern Med 1999;159(3):266–70. https://doi.

org/10.1001/archinte.159.3.266.
35. Coomes EA, Haghbayan H. Favipiravir, an antiviral for COVID-19? J Antimicrob Chemother 2020;75(7):2013–4. https://doi.org/10.1093/ jac/dkaa171.
36. Pilkington V, Pepperrell T, Hill A. A review of the safety of favipira- vir - a potential treatment in the COVID-19 pandemic? J Virus Erad 2020;6(2):45–51.
37. Li J, Zhang C, Wu Z, Wang G, Zhao H. The mechanism and clinical outcome of patients with corona virus disease 2019 whose nucleic acid test has changed from negative to positive, and the therapeutic efficacy of favipiravir: a structured summary of a study protocol for a randomised controlled trial. Trials 2020;21(1):488. https://doi.org/ 10.1186/s13063-020-04430-y.
38. Han H, Ma Q, Li C, et al. Profiling serum cytokines in COVID-19 patients reveals IL-6 and IL-10 are disease severity predictors. Emerg Microbes Infect 2020;9(1):1123–30. https://doi.org/10.1080/22221751.2020.1770129.
39. Kolilekas L, Loverdos K, Giannakaki S, et al. Can steroids reverse the severe COVID-19 induced "cytokine storm"? [published online ahead of print, 2020 Jun 12]. J Med Virol. 2020. https://doi.org/10.1002/ jmv.26165
40. Singh AK, Majumdar S, Singh R, Misra A. Role of corticosteroid in the management of COVID-19: a systemic review and a clinician's perspective. Diabetes Metab Syndr 2020;14(5):971–8. https://doi.org/ 10.1016/j.dsx.2020.06.054.
41. Randomised Evaluation of COVID-19 Therapy (RECOVERY). Dexa- methasone results. Available at: https://www.recoverytrial.net/results/ dexamethasone-results. Accessed June 29, 2020.
42. Deftereos SG, Giannopoulos G, Vrachatis DA, et al. Effect of colchi- cine vs standard care on cardiac and inflammatory biomarkers and clini- cal outcomes in patients hospitalized with coronavirus disease 2019: The GRECCO-19 randomized clinical trial. JAMA Netw Open 2020;3 (6):e2013136. https://doi.org/10.1001/jamanetworkopen.2020.13136.
43. World Health Organization. R&D blueprint and COVID-19. Available at: https://www.who.int/blueprint/priority-diseases/key-action/novel- coronavirus/en/. Accessed March 25, 2020.
44. B€osm€uller H, Traxler S, Bitzer M, et al. The evolution of pulmonary pathology in fatal COVID-19 disease: an autopsy study with clinical correlation [published online ahead of print, 2020 Jun 30]. Virchows Arch. 2020;1-9. https://doi.org/10.1007/s00428-020-02881-x
45. McFadyen JD, Stevens H, Peter K. The emerging threat of (micro) thrombosis in COVID-19 and its therapeutic implications:[published online ahead of print, 2020 Jun 26] Circ Res 2020;127(4):571–87. https://doi.org/10.1161/CIRCRESAHA.120.317447.
46. Bhandari S, Rankawat G, Bagarhatta M, et al. Clinico-radiological evaluation and correlation of CT chest images with progress of
disease in COVID-19 patients. J Assoc Physicians India 2020;68
(7):34–42.
47. Chan KH, Slim J, Shaaban HS. Pulmonary Embolism and Increased Levels of d-Dimer in Patients with Coronavirus Disease [published online ahead of print, 2020 Jul 2]. Emerg Infect Dis. 2020;26(10):10.3201/eid2610.202127. https://doi.org/10.3201/ eid2610.202127
48. Artifoni M, Danic G, Gautier G, et al. Systematic assessment of venous thromboembolism in COVID-19 patients receiving thromboprophylaxis: incidence and role of D-dimer as predictive factors. J Thromb Thrombol- ysis 2020;50(1):211–6. https://doi.org/10.1007/s11239-020-02146-z.
49. Mestre-G omez B, Lorente-Ramos RM, Rogado J, et al. Incidence of pulmonary embolism in non-critically ill COVID-19 patients. Predict- ing factors for a challenging diagnosis [published online ahead of print, 2020 Jun 29]. J Thromb Thrombolysis. 2020;1-7. https://doi.org/ 10.1007/s11239-020-02190-9
50. Ackermann M, Verleden SE, Kuehnel M, et al. Pulmonary vascular endothelialitis, thrombosis, and angiogenesis in covid-19. N Engl J Med 2020;383(2):120–8. https://doi.org/10.1056/NEJMoa2015432.

51. Turshudzhyan A. Anticoagulation options for coronavirus disease 2019 (COVID-19)-induced coagulopathy. Cureus 2020;12(5):e8150. https://doi.org/10.7759/cureus.8150.
52. Glatthaar-Saalm€uller B, Mair KH, Saalm€uller A. Antiviral activity of aspirin against RNA viruses of the respiratory tract-an in vitro study. Influenza Other Respir Viruses 2017;11(1):85–92. https://doi.org/ 10.1111/irv.12421.
53. Tang N, Bai H, Chen X, Gong J, Li D, Sun Z. Anticoagulant treatment is associated with decreased mortality in severe coronavirus disease 2019 patients with coagulopathy. J Thromb Haem 2020;18(5):1094–9. https://doi.org/10.1111/jth.14817.
54. Moores LK, Tritschler T, Brosnahan S, et al. Prevention, Diagnosis, and Treatment of VTE in Patients With Coronavirus Disease 2019: CHEST Guideline and Expert Panel Report [published online ahead of print, 2020 Jun 2]. Chest. 2020;S0012-3692(20)31625-1. https:// doi.org/10.1016/j.chest.2020.05.559
55. Westafer LM, Elia T, Medarametla V, Lagu T. A transdisciplinary COVID-19 early respiratory intervention protocol: an implementa- tion story. J Hosp Med 2020;15(6):372–4. https://doi.org/10. 12788/jhm.3456.

## AN URGENT WARNING TO THE WORLD
## DR. MICHAEL YEADON




https://www.bitchute.com/video/cdKu2RXGAWyu/

https://bit.ly/3ynxbSM

DR PETER MCCULLOUGH INTERVIEWED BY DR PETER BREGGIN
TALKING COVID NUMBERS AND THE NUMBERS ARE SCARY, BUT FAKE

https://www.bitchute.com/video/FNwoCTnEbNEg/

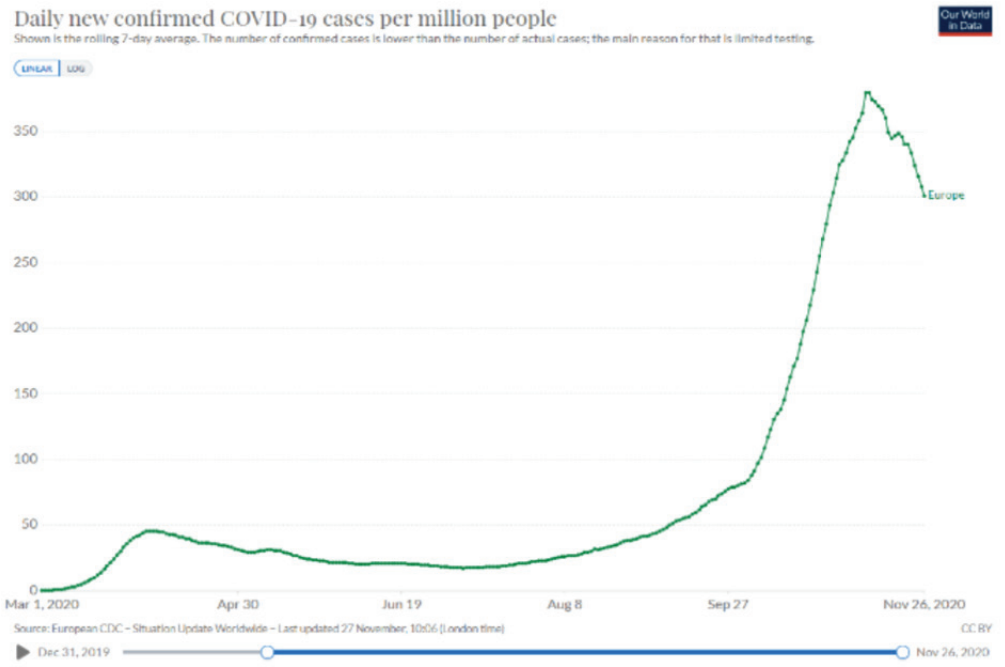
# PCR-based COVID testing has failed and is not a proper basis to lockdown the nation, let alone decide on tiers for restrictions

Briefing paper for MPs – 26th November 2020
This document has been authored by:

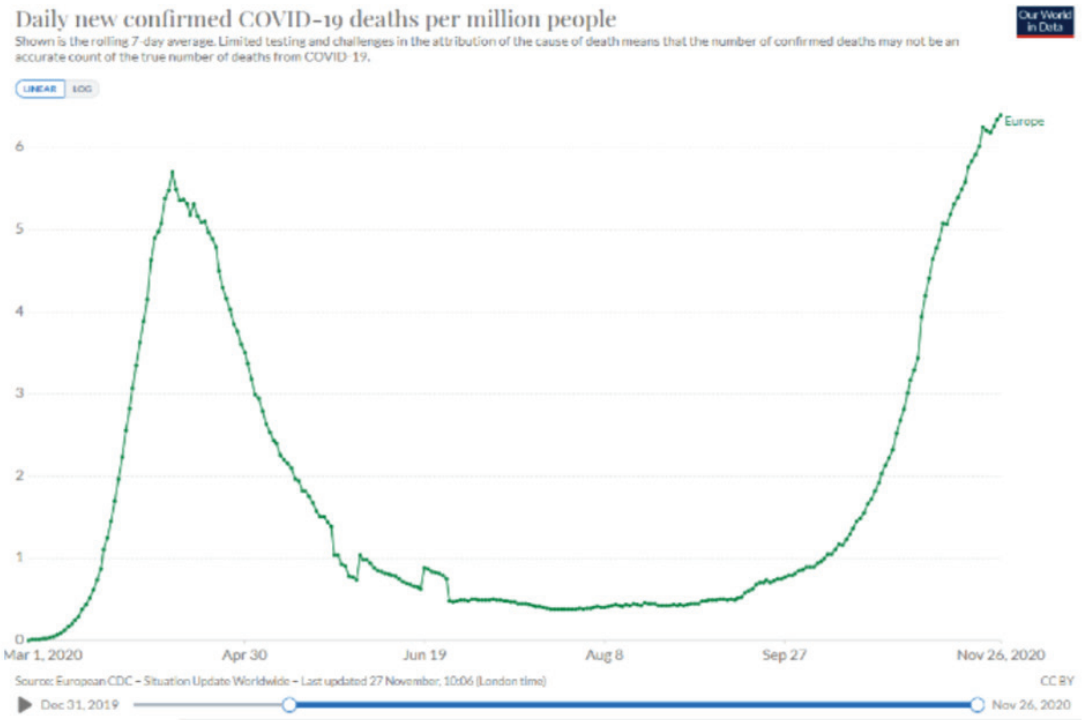
1. Clare Craig BM BCh FRCPath (craig.clare@gmail.com)
2. Jonathan Engler MBChB LLB (jengler@outlook.com)
3. Mike Yeadon BSc Hons (Biochem-tox) PhD (Pharmacol) (yeadon_m@yahoo.co.uk)
4. Christian McNeill LL.B and Dip LP (christian.mcneill@icloud.com)
MPs are invited to contact any of the above if they have further questions, for example the source of any data quoted.

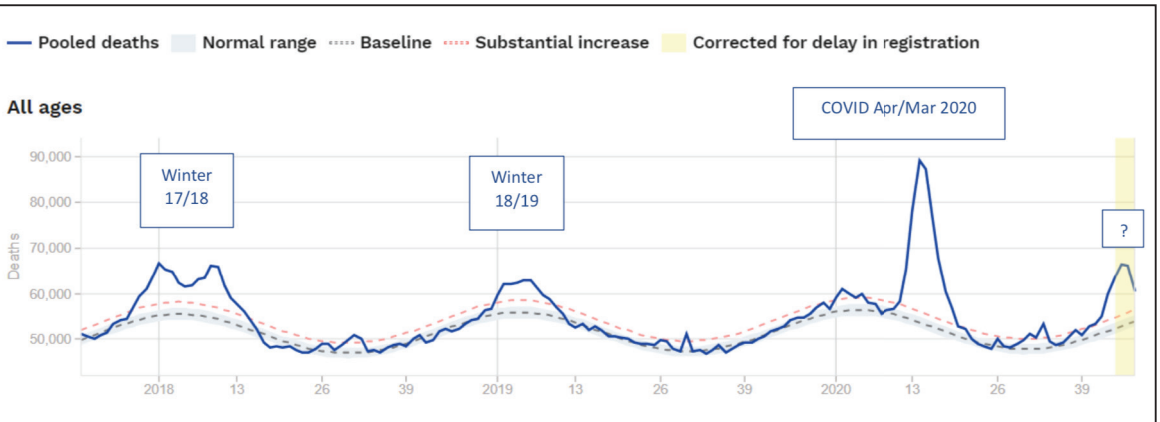
THE CONUNDRUM ACROSS EUROPE

## 1. "Cases" rose sharply over Autumn across Europe



# 2. "COVID deaths" matched this – reaching levels higher than in Spring pandemic



Across Europe, including in the UK, we see the following:

1. Daily "cases" sky-rocketed in Europe as Autumn arrived.
2. Daily deaths labelled as "COVID deaths" rose in line with "cases" – to levels apparently higher than at the Spring peak.
3. BUT: Total all-cause mortality does not reflect the above.

WHAT IS BEHIND THIS CONUNDRUM?

The central thesis of this paper is that we have a major problem with PCR-testing. This is distorting policy and creating the illusion that we are in a serious pandemic when in fact we are not.

This is causing:

1. In the UK a significant proportion of current excess deaths apparently being caused by restricted access to the NHS.
2. An NHS staffing crisis which is exacerbating matters.
3. Unprecedented assaults on civil liberties and the economy.

What we need to do about this:

4. Stop mass-testing using PCR in the UK and replace with Lateral Flow Tests where required. If we are correct, this single measure alone will cause a sudden drop in "cases" (as seen in Liverpool) and allow the UK to return to normal life within weeks.
5. Other recommendations as detailed later in this document. It should be noted that legal cases and technical challenges to PCR mass-testing are growing across Europe, including in the UK.

NB: The info contained in this paper is merely illustrative of some of the key issues and does not represent the totality of the evidence available. The current problem is that both COVID cases and COVID deaths are being overstated massively due to confused definitions and poor measurements. Claims of COVID deaths should be backed up with evidence that they were really caused by COVID. From the data, it seems reasonable to assume that at least 10% were not caused by COVID. They have been misdiagnosed due to faulty testing – we explain our reasoning below, point 5 being the most important. Misdiagnosis has resulted from false positive laboratory tests.'

An epidemic is defined as the wide spread of an infectious disease. The final letter of COVID is "D" for "disease". A disease requires symptoms. Public Health England's National COVID-19 case definition required the presence of symptoms. Somehow symptoms have

become irrelevant. We are now chasing down the healthy, immune population who are being over tested. This includes those in hospital with other symptoms and for other reasons. If we tested for influenza in the same way and with the same implications, we would have to lockdown every winter.

A false positive pseudo-epidemic is a well described phenomenon in the medical literature which results in an exponential rise in diagnosed cases and deaths but no excess deaths. PCR testing is renowned for it and the "second wave" of Swine Flu in 2009 was entirely a false positive pseudo-epidemic only stopped by stopping the PCR testing replacing it with antigen testing. SAGE have been focused on the constant low false positive rate of the testing equipment but the false positive rate of the whole testing process is variable and can rise.

Evidence of one laboratory with a low operational false positive rate gives no indication of what the operational false positive rate is in a different laboratory or at a different point in time.

A good lay description of a false positive pseudo-epidemic can be found at:
https://www.nytimes.com/2007/01/22/health/22whoop.html

FUNDAMENTAL FLAWS OF THE CURRENT UK APPROACH

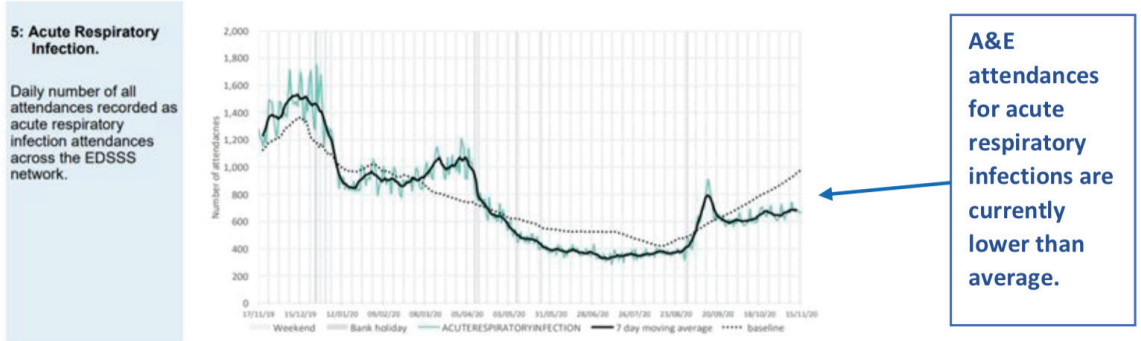



*Figure 2 Daily acute respiratory infection attendances as accident and emergency compared with baseline from previous years. From weekly Emergency Department Syndromic Surveillance System Bulletin.*

***1) The definition of COVID deaths is too broad***. Currently any death with an incidental positive COVID test within prior 28 days is counted as COVID. However, even deaths from the misdiagnosis of respiratory failure will result in COVID being put as the primary cause. There is no post mortem evidence that these are COVID deaths. There is no equivalent rise in death certificates with mentions of pneumonia as was seen in the spring. Accident and Emergen-

cy attendances for acute respiratory infections are currently 300 per day lower than average. ***2) The tests are not measuring the disease***. It is nonsense to rely simply on positive test cases without requiring the presence of symptoms to define the scale of the epidemic. However, if positive tests are to be used, determination of the test accuracy rate is absolutely essential (especially the false positive rate). These should be independently deter-

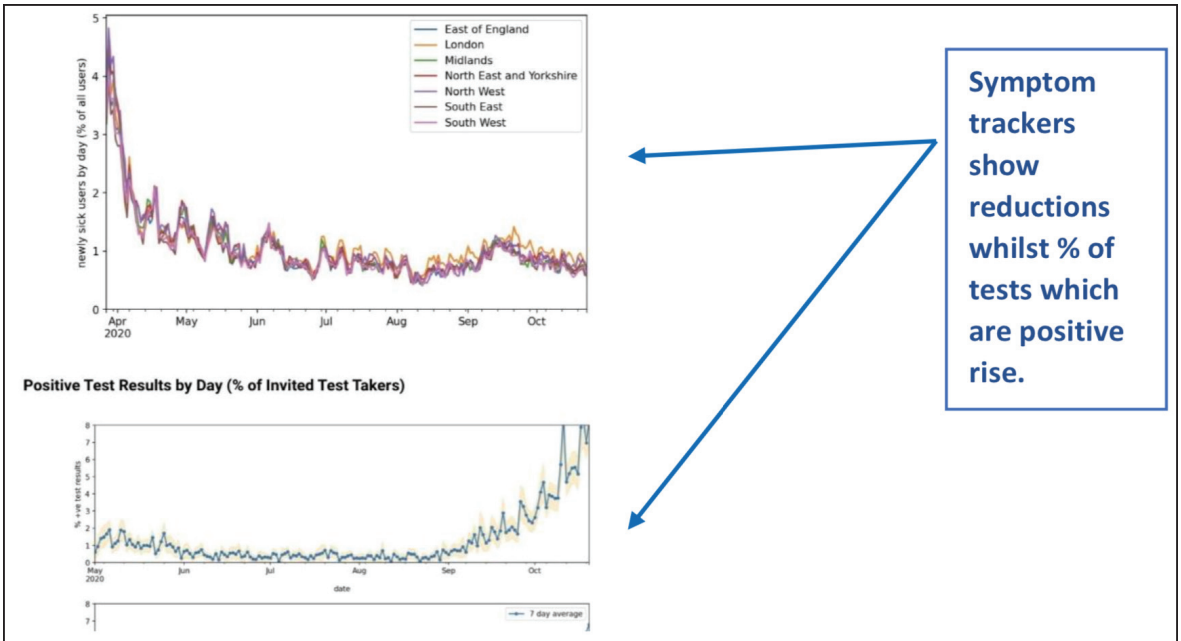



*Figure 3 Zoe App symptom tracker data in top graph with positive PCR test results in bottom graph*

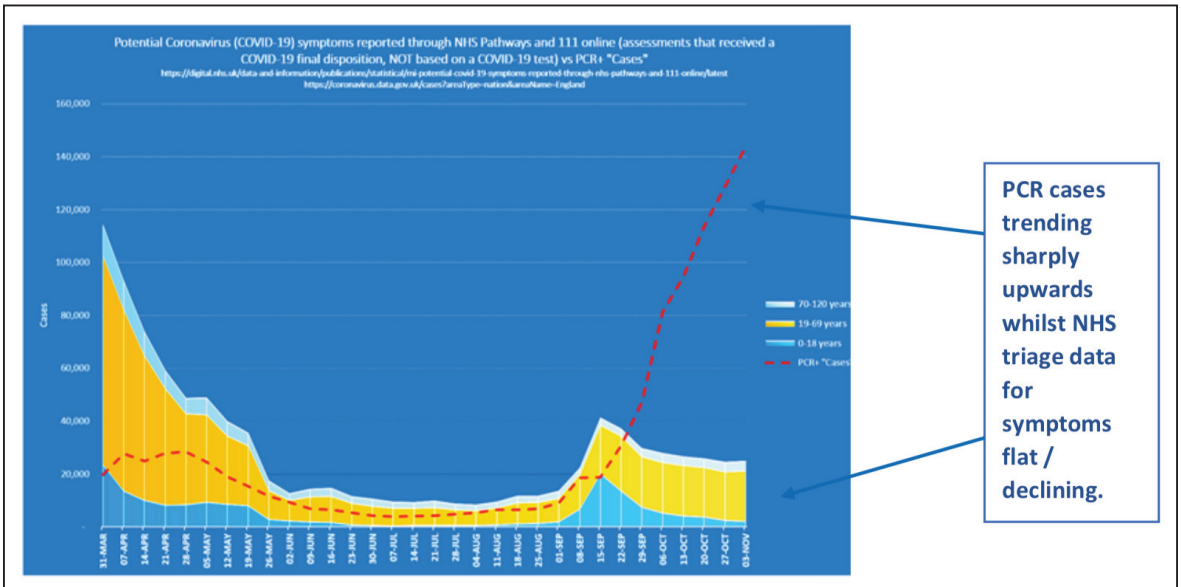



*Figure 4 NHS daily triage data by age plotted against weekly PCR positive test results*

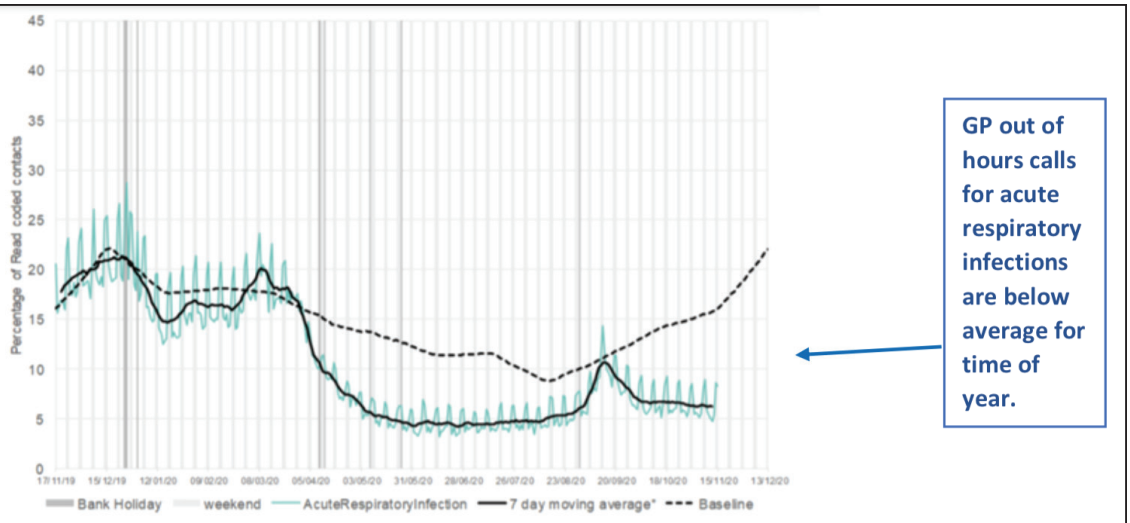



*Figure 5 GP Out of Hours Syndromic Surveillance Data for acute respiratory infections (solid line) compared to baseline (dotted line).*

mined. This work must be current to assess the current rates. Those defending the tests claim they have been quality checked by the use of "whole genome sequencing" – but that test has never been used as a diagnostic test in this way either, so it's like using one unvalidated process to validate another.

The final page of this briefing provides some more background on why even an apparently low FPR can be so misleading. Symptom trackers, NHS triage data and GP consultation data all show that numbers of patients attending with COVID like conditions returned to background levels; yet positive test results continued to rise during this time. This strongly implies that the test results are picking up largely false positives.

***3) Excess deaths are not all COVID deaths.*** Pandemics can cause excess deaths. Lockdowns can also cause excess deaths and we saw excess deaths from many causes in Spring. There

Figure 6 Cumulative excess deaths in the 15-44 yr old age group showing incessant rise throughout 2020

appears to have been no attempt to analyse these deaths or factor them into current decision-making processes. Normal interactions with the health service have still not resumed and excess deaths in the 15 - 44 year-old age group have climbed steadily throughout the year. These are nearly all non-COVID deaths.

4) There is an NHS staffing crisis caused by false positive test results. NHS including ambulance staff and care home staff are all being tested and made to isolate merely on the basis of a single positive test even when asymptomatic, when the evidence on spread from asymptomatic subjects is equivocal at best. This is causing a staffing crisis in the NHS which will undoubtedly result in patients dying.

5) The only confirmatory testing carried out has shown no COVID. Army testing in Liverpool uses a different and more reliable test – the "Lateral Flow Test ("LFT"). It has demonstrated that there is minimal COVID in the Liverpool community, the alleged hotspot. The numbers testing positive are barely above the false positive rate reported for the LFT meaning there were no real COVID cases found. In other words, the Army results confirm the fact that at least 90% of the PCR were false positives and the government is panicking on the basis of a massively exaggerated and unreliable statistic.

Numerous well-conducted studies have demonstrated that LFT tests have a sensitivity of about 80% (ie they identify 4 out of 5 "true" cases). An 80% sensitivity rate means not every case is found, but it is actually the same sensitivity rate as seen with PCR testing. LFT tests are particularly good at identifying patients during the infective period and that is after all what testing is attempting to achieve. However, when contradictions are seen between LFT and PCR results, many people rush to the accusation that LFT testing are missing cases. In fact, LFT testing is highlighting the failings of PCR testing.

6) Weak criteria used to declare a positive will result in false positives. Testing in May, by Imperial College showed that only half of the positive results from commercial laboratories were true positives and they questioned the criteria these laboratories were using to define a positive.

7) The results from PCR testing no longer fit reality. ONS random population sampling, using PCR testing, predicted that 4300 in 100,000 of the population of Salford (4.3%) had COVID on 11th November (16 times higher than their national estimate for 27th April to 10th May). Typically, during a pandemic, the general prevalence in the entire population is substantially less than 1%. Finally, positivity rates from PCR testing started to become strongly correlated with the volume of testing carried out after the middle of July.

The graphs show the data for London aggregated. But the pattern is the same for all boroughs in London. After mid-July, the best indicator of whether a test would be positive

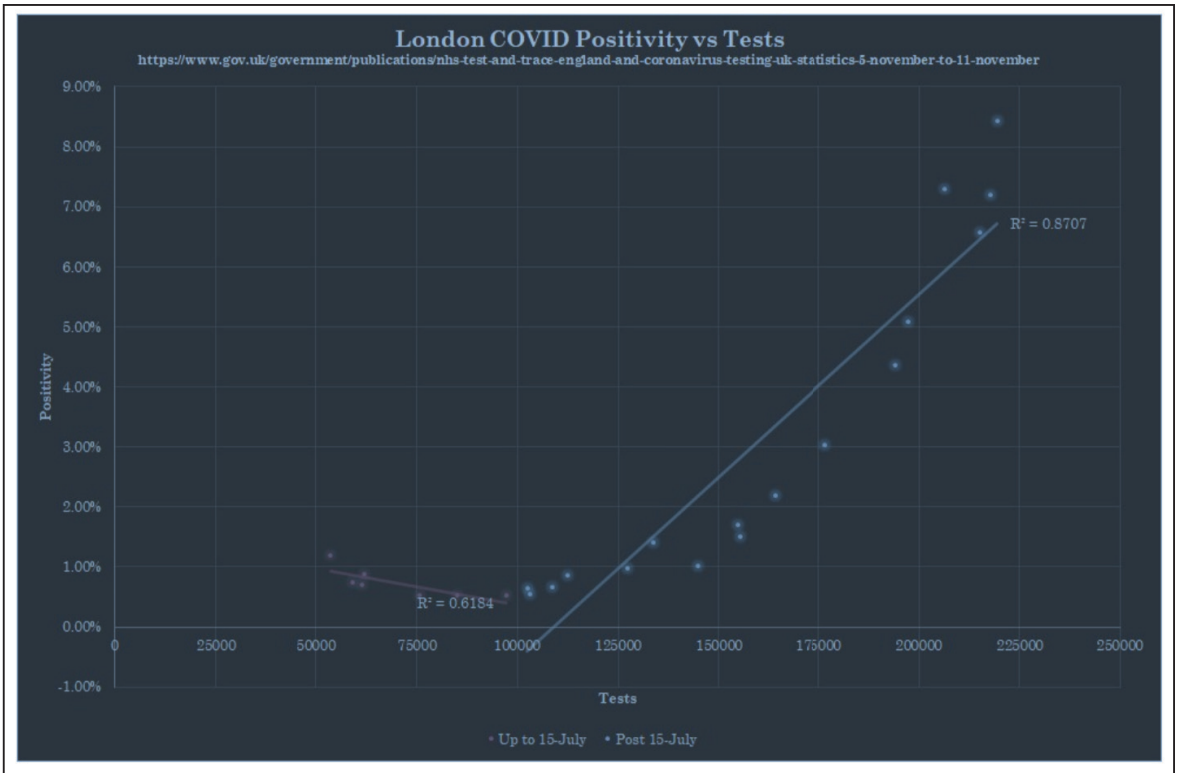
was the volume of testing carried out – not where the person lives.

This cannot be to do with biology and is entirely artefactual. Readers might well ask – what happened in mid-July?

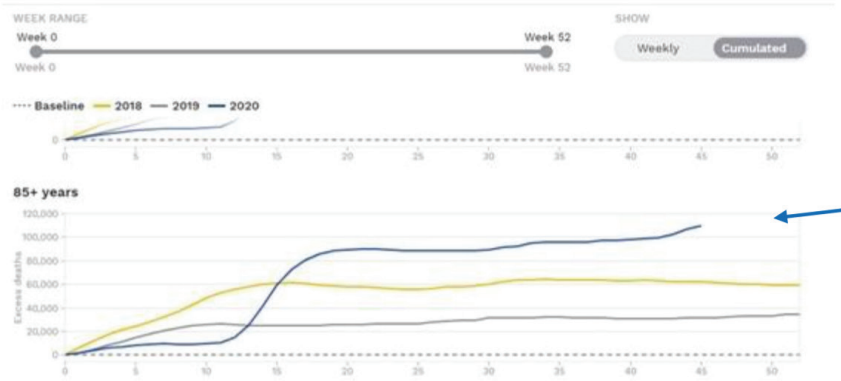
The answer is that from that date, the volume of Pillar 2 (Community) testing was ramped up hugely whilst the volume of Pillar 1 (in hospital / PHE) testing remained constant.

Pillar 2 testing - conducted by private labs at high volume - involves the use of DIY kits, self- sampling, collections in car parks, samples sent by post and car park collections, creating huge potential for contamination issues and other operational problems.

This is incontrovertible proof that the rise in cases is purely as a result of problems with testing. The data is currently being analysed for the rest of England and is consistent with London. The PCR-based system routinely reports positivity values exceeding the absurd, and these are accepted without comment. This has been allowed to happen because the assumption is that PCR is high science and cannot be far wrong. Nothing can be further from the truth.

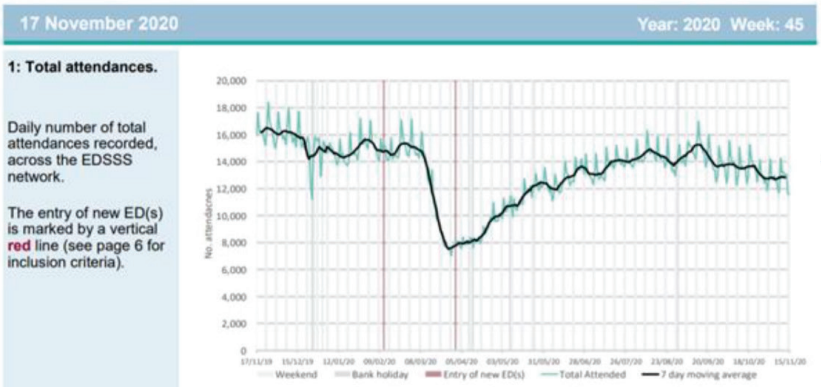



*Proportion of COVID tests in London which are positive vs number of tests conducted.*



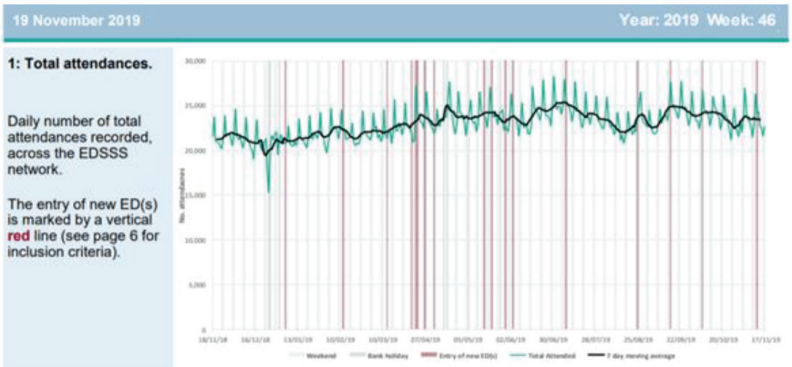

Excess deaths in the COVID vulnerable 85+ group showed sharp rise in Spring, and a recent early mild uptick.

Figure 7 For comparison, the cumulative excess deaths in the over 85s clearly shows the spring pandemic after which it plateaus before we enter winter associated excess deaths at a slightly earlier date than in the preceding two years.




A&E total attendances in 2020 dipped over Spring, and are still running at a lower level than a year ago.

Figure 8 Accident and Emergency attendances 2020




BUT: A&E total attendances are usually fairly constant across the year – as seen here in 2019.

Figure 9 Accident and Emergency attendances 2019

## RECOMMENDED ACTIONS

The following are the most important actions to be taken immediately:

1. Stop mass testing asymptomatic individuals. The entire basis for mass testing the population is based on the flawed and questionable assumption that transmission of infection from those with no symptoms is an important contribution to epidemic spread. Regardless of arguments about this, it is clear we are no longer in an epidemic and therefore there is no justification for mass testing, no matter the method involved.

2. Re-test a sample of hospitalised patients previously diagnosed (by PCR alone) using Lateral Flow Tests. Even if LFT misses some cases, the majority should still test positive. If the numbers testing positive are low, this confirms we have a problem with the PCR test.

3. If PCR is to continue to be used at all, it should be at low scale and on no account should this involve the high capacity facilities known as Lighthouse Labs. The stretch for capacity is wholly responsible for the PCR false positive pseudo epidemic. It is the view of those with the greatest hands-on experience of PCR that such facilities cannot yield results of the precision now required.

4. Even conducted at lower scale, it is vital that additional quality control measures for PCR testing are instituted, including (but not limited to) running 'end to end' negative controls containing other viruses and other human DNA through the entire test system, in order to quantify any false positive results due to laboratory issues (akin to "secret shopper" checking). Additionally, PCR testing must revert to high stringency, with a requirement for all three genes to be positive - as used in Spring.

5. Hospital / NHS and care-home staff absence policies should be based primarily on LFT testing, using PCR testing for confirmation of positive tests only.

6. The definition of "an outbreak" must require subjects to have positive LFT results with confirmatory testing using high-quality PCR tests conducted in a well-managed laboratory, combined with symptoms and evidence of direct contact.

7. Overturn the Ofcom ban on free speech in broadcast media. Earlier in 2020 OFCOM issued a series of innocent sounding Notes to Broadcasters in relation to reporting on Coronavirus matters. These require broadcasters to adhere to certain lines consistent with government policy and these have had the effect of suppressing much by way of alternative viewpoints. As we are no longer in a public health emergency, the justification for quashing alternative scientific voices has gone and only by hearing all views can a valid scientific consensus be reached.

APPENDIX

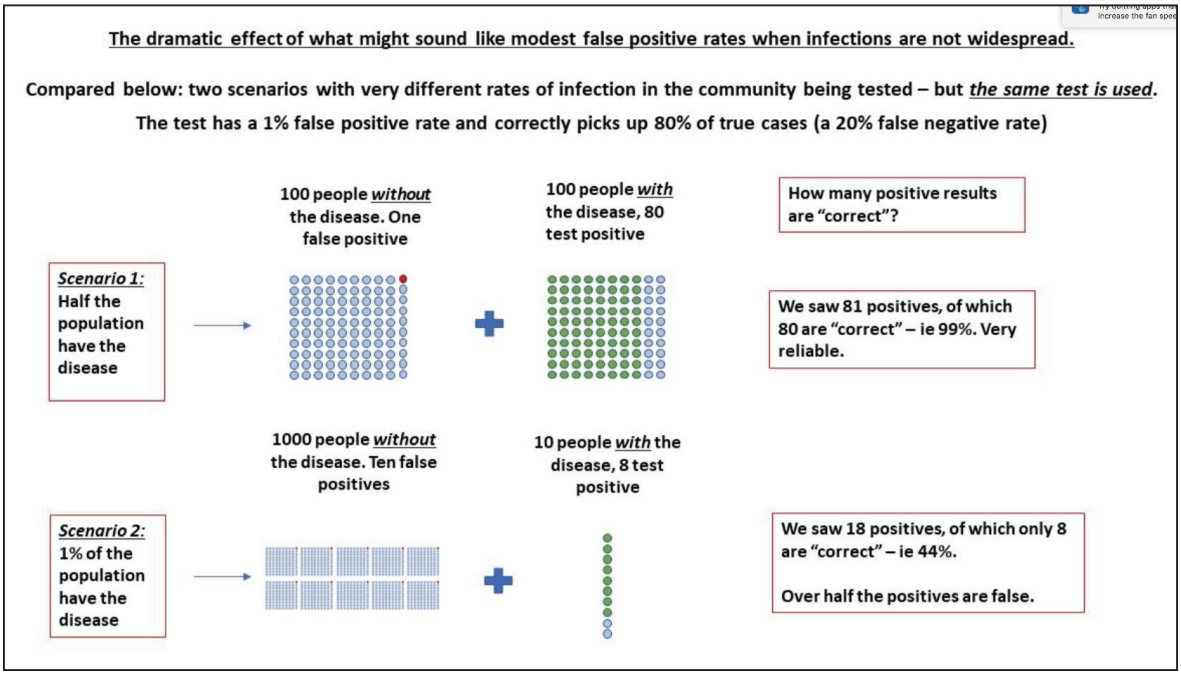
WHY LOW FALSE POSITIVE RATES CAN STILL BE PROBLEMATIC

So what is the Operational FPR for COVID testing?

The government has not published it and has admitted it does not know what it is, hence it's not possible to say what fraction of the tests are genuine. All of them? Half of them? None of them? Any reasonable person would regard it as an affront to permit continued deployment of this test.

It would be negligent for a physician to perform a diagnostic test for their patient without knowing what the results meant, yet by their own admission, the Government does not know what their results mean. It's tendentious to claim that an operational FPR obtained in a different test (not even the same test) can be adopted. It cannot. This yawning gap must be closed & meanwhile the test discontinued.

In a SAGE paper from June, it was stated that for other RNA viruses the OFPR ranged from 0.8 to 4.0%. For COVID testing, a figure of less than 1% has been suggested. We know that the quality of the testing lab can dramatically affect the FPR, and we know that there have been significant quality issues as volumes were ramped up at a faster speed than has ever been done before. So, 1% is most likely a significant under-estimate of the current situation. As for how many people have it, the ONS say it is currently around 1.2% - but this is simply



not credible, when in late April / early May they claimed that only 0.27% had it, and the Liverpool mass testing found only 0.6% (around the same as the operational FPR for the "Lateral Flow Test" which would mean there was no COVID in Liverpool).

Using a figure of 2% for FPR, a 20% false negative rate, and incidence in the population of 0.5%, ***around 83% of all positive tests results would be misdiagnoses.***

## Dr. Michael Yeadon on Vaccine Passports: We Will be Standing at the "Gates of Hell" if Implemented, and They Will Push Us In

***https://healthimpactnews.com/2021/dr-michael-yeadon-on-vaccine-passports-we-will-be-standing-at-the-gates-of-hell-if-implemented-and-they-will-push-us-in/***

I am providing another short video clip of the interview with Dr. Michael Yeadon in the Perspectives on the Pandemic published on their YouTube channel.

https://www.youtube.com/watch?v=Xi6MYCslZ1E

In this video clip, Dr. Yeadon explains how universal vaccine passports do not benefit either the COVID vaccinated or unvaccinated, but only the totalitarian controllers who implement it, and that if they succeed, "we'll not only be standing at the gates of Hell, we'll just be given a little push and in we'll go."

After this short clip, I am providing a link to Makia Freeman's excellent article "Vaccine Passports: One Passport to Rule Them All."

Vaccine Passports: One Passport to Rule Them All
By Makia Freeman, The Freedom Articles

https://thefreedomarticles.com/vaccine-passports-one-passport-to-rule-them-all/

Vaccine passports are a major goal of those orchestrating Operation Coronavirus, though not the ultimate end goal of the COVID agenda. The purpose of vaccine passports is clear, despite whatever flimsy and mealy-mouthed excuses given to justify them: to restrict the movement of the unvaccinated, or in plainer terms, to restrict the movement of those who have seen through the agenda. There are no clever legal arguments that can distract from this basic truth: vaccine passports are inherently discriminatory.
In a sane society, no nation that even pays lip service to caring about human rights could

claim that vaccine passports are in alignment with their existing laws on individual rights, freedom of choice, freedom of movement, informed consent and medical sovereignty. However, it hardly bares stating that we do not live in a sane world. Below is a brief list of the vaccine passport schemes that are either proposed, about to be rolled out or already in existence. This is a worldwide agenda being rapidly promoted and implemented.

## EU Planned for Vaccine Passports in 2018

Long before the word 'coronavirus' become a household world, or the term 'COVID' even existed, the European Union (EU) was planning for a vaccine passport scenario.

The European Commission (the executive arm of the EU) published a proposal for vaccine passports on April 26th, 2018, in a document entitled "Proposal for a Council Recommendation on Strengthened Cooperation against Vaccine Preventable Diseases". It lays out the plan for a "vaccine passport" or "vaccine card" and "vaccine portals":

HEREBY WELCOMES THE COMMISSION'S INTENTION TO:

17. Examine issues of insufficient vaccine coverage caused by cross-border movement of people within the EU and look into options to address them, including developing a common EU citizens' vaccination card/passport, compatible with electronic immunisation information systems and recognised for use across borders.

HEREBY WELCOMES THE COMMISSION'S INTENTION TO TAKE THE FOLLOWING ACTIONS, IN CLOSE COOPERATION WITH THE MEMBER STATES:

10. Aim at establishing a European Vaccination Information Sharing (EVIS) system, coordinated by the European Centre for Diseases Prevention and Control (ECDC), in order to:

a. Together with the national public health authorities,

i. examine the options of establishing, by 2020, guidelines for a core EU vaccination schedule, aiming to facilitate the compatibility of national schedules and promote equity in Union citizens' health protection, and subsequently ensuring broad uptake of the core schedule as well as a common vaccination card;

ii. strengthen the consistency, transparency, and methodologies in the assessment of national and regional vaccination plans, by sharing scientific evidence and tools with the support of National Immunization Technical Advisory Groups (NITAGs);

iii. design EU methodologies and guidance on data requirements for better monitoring

of vaccination coverage rates across all age groups, including healthcare workers, in co-operation with the World health Organisation (WHO). Collect such data and share them at EU level;

b. By 2019, establish a European vaccination information portal, with the support of the European Medicines Agency, to provide online objective, transparent and updated evidence on vaccines, their benefit and safety, and the pharmacovigilance process.

c. Monitor online vaccine misinformation and develop evidence-based information tools and guidance to support Member States in countering vaccine hesitancy, in line with the Commission Communication on tackling online disinformation."

Interestingly, on pg.13, this document also mentions the term vaccine hesitancy as it recommends a "Joint Action on Vaccination, co–funded by the third Programme for the Union's action in the field of health … to address vaccine hesitancy."

Vaccine hesitancy has also become a theme in the COVID Operation because so many people have become aware of just how toxic vaccines can be and how experimental these ones are in particular; in my article from August 2020 I revealed how a Yale study was analyzing how to combat vaccine hesitancy and increase vaccine uptake through a variety of psychological techniques and manipulation.

https://thefreedomarticles.com/toxic-vaccine-adjuvants-the-top-10/

https://thefreedomarticles.com/10-things-to-know-experimental-covid-vaccines/
https://thefreedomarticles.com/same-fake-pandemic-similarities-1976-swine-flu-2020-covid/

European Vaccine Passports

Given the above documents, it's no great surprise that Europe is at the forefront of implementing vaccine passports. The UK and many European countries are getting close to rolling out their passport scheme; on March 17th 2021, the European Commission proposed the following draft legislation to create a "Digital Green Certificate" as you can see from this document.

https://ec.europa.eu/commission/presscorner/detail/en/ip_21_1181

https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0130

In a classic example of doublespeak, Commissioner for Justice, Didier Reynders, said: "*With*

*the Digital Green Certificate, we are taking a European approach to ensure EU citizens and their family members can travel safely and with minimum restrictions this summer. The Digital Green Certificate will not be a pre-condition to free movement and it will not discriminate in any way. A common EU-approach will not only help us to gradually restore free movement within the EU and avoid fragmentation."*

No pre-condition for movement? Not discriminate in any way? The very essence of the vaccine passport is regulate and restrict movement, as well as to discriminate. Otherwise, what is the point of it? This is a constant theme of the COVID Operation. Politicians make rules to control your life, and right when they announce these rules, they claim they are not controlling you. Black is white, up is down and tyranny is freedom.

American Vaccine Passports

They're coming to America too. The US state of New York was the first state to introduce a pilot program. Authorities have said it's optional, but that's how all these schemes of control initially work; first they're optional to break down resistance and get people accustomed, and then they're mandatory. New York is calling its vaccine passport the "Excelsior Pass" and the official announcement states:

Developed in partnership with IBM, the Excelsior Pass will use proven, secure technology to confirm an individual's vaccination or a recent negative COVID-19 test through a confidential data transfer to help fast-track the reopening of theaters, stadiums and other businesses in accordance with New York State guidelines… The Excelsior Pass will play a critical role in getting information to venues and sites in a secure and stream-lined way, allowing us to fast-track the reopening of these businesses and getting us one step closer to reaching a new normal. On the upside, there are certain states which have preemptively banned vaccine passports in some form or another, including Florida, Texas, Arizona, Montana and Idaho.

https://www.nbcnews.com/news/us-news/these-states-are-attempting-ban-or-curtail-use-vaccine-passports-n1264665

As for much of the duration of the COVID op, support or resistance to vaccine passports is mostly following party lines, with the left-wing Democratic states supporting it and the right-wing Republican states resisting it.

Vaccine Passports in Israel, China and India

Israel has earned itself another dubious distinction by leading the world in COVID vaccination rates, and by already implementing its vaccine passport program. Unvaccinated

Israelis are being banned from going to so-called non-essential places. Tyrannical Israeli Health Minister Yuli Edelstein warned:

"Whoever doesn't vaccinate will only go out to supermarkets or pharmacies, while the vaccinated will go to stadiums and gyms."

https://www.timesofisrael.com/government-plans-to-punish-businesses-that-serve-unvaccinated-customers-report/

The tyranny doesn't stop there. Israel has also issued "Freedom Bracelets" to be worn by those entering the country from abroad.

https://youtu.be/qgd_mVbZBcU

Israel's parliament joined action taken previously by the Spanish government in approving a law to create a registry of people refusing the COVID vax.

https://www.politico.eu/article/spain-coronavirus-vaccine-refusal-registry-with-eu-countries/

https://www.cbsnews.com/news/covid-vaccine-israel-law-personal-information-privacy/

Interestingly, UK Cabinet Office minister Michael Gove was recently seen arriving in Israel for what they say was "vaccine passport talks" but in reality, from those who know the backstory of the Zionist New World Order (NWO), was likely his marching orders.

https://jewishnews.timesofisrael.com/michael-gove-arrives-in-israel-for-vaccine-passport-talks/

https://thefreedomarticles.com/israel-planned-home-of-new-world-order/

China and India have both joined the vaccine passport game. China called their version the "International Travel Health Certificate" (downloadable from its WeChat mobile app) while India has a QR code certificate version.

https://asia.nikkei.com/Spotlight/Coronavirus/China-rolls-out-vaccine-passport-aiming-to-revive-foreign-travel

https://www.hindustantimes.com/cities/others/got-covid-19-vaccine-you-ll-get-qr-code-certificate-on-phone-101610479579084.html

## One Passport to Rule Them All

No matter what fancy and different names these passports, apps and QR codes have, there are plans afoot to link them all via a common software or framework. The leading developers of this technology include AOK Pass, Common Pass, the Vaccination Credential Initiative, Good Health Pass Collaborative and the IATA Travel Pass.

https://www.aokpass.com/

https://vaccinationcredential.org/

https://www.goodhealthpass.org/

https://www.iata.org/en/programs/passenger/travel-pass/

This is a clear manifestation of the NWO Agenda of a One World Government with detailed information on every single person (except for the ruling elite) on Earth, who are planned to be its subjects or slaves. This has been a long time coming. It seems like a long time ago now – over a year ago – when Bill Gates started mouthing off about the need for immunity certificates and digital vaccine passports.

https://thefreedomarticles.com/digital-vaccine-certificates-bill-gates-plan-post-coronavirus/

The plan is not hidden, but rather wide out in the open. Of course, there is a distinct lack of logic about the whole issue. First of all, as I have exhaustively documented, there is no evidence that the virus SARS-CoV-2 exists.

https://thefreedomarticles.com/10-reasons-sars-cov-2-imaginary-digital-theoretical-virus/

But putting that inconvenient truth aside for a moment, why couldn't natural immunity to the virus qualify you for the vaccine passport? Mainstream brainwashed medical authorities may say it's because you can still get re-infected. However the same goes for the vaccine … hence all the talks of a 2nd and 3rd shot (actually the plan is to give people countless shots as they upgrade and rewire their DNA operating system). This is the very same group of vaccines which by the way don't give you proper immunity and are even admitted to only protect against mild symptoms and not to stop transmission.

It's not about actual real immunity to disease. It's about finding out who is vaccinated and who is unvaccinated, and subsequently punishing the non-compliant, disobedient, recal-

citrant unvaccinated ones. For those who want their shiny new vaccine passport – think about this. What happens when the authorities say that you have to keep getting vaxxed … and vaxxed … and vaxxed … every year … just to keep your passport and privileges? Are we going to stand in our inherent sovereign rights or grovel beneath the slavemasters for government-bestowed privileges?

## Final Thoughts

The truth is that vaccine passports are a scheme to force people into getting vaxxed so that they become genetically modified humans. The vaccine is the real bioweapon, not an imaginary virus. The vaccine passports will function to make life uncomfortable for the unvaccinated, and also as a registration system to distinguish between the vaccinated and unvaccinated, so the NWO controllers know exactly which citizens have certain nanotechnology embedded inside of them – which you can be sure will be used to further whatever nefarious goals the NWO manipulators have in mind.

## HEALTH MINISTER ISSUES WARNING TO THOSE WHO WON'T HAVE SHOTS
February 11th, 2021

Vaccine refusers will be kept to 'supermarkets, pharmacies' when Israel opens up. Crackdown planned for businesses that serve those without vaccines; PM says refusers 'endanger us all,' risk health system; fewer than 1,000 seriously ill for first time in a month.

The Health Ministry is reportedly planning to clamp down on Israelis who refuse to vaccinate against the coronavirus and impose severe sanctions on businesses that accept unvaccinated customers and on individuals who forge a document that says they have been vaccinated.

According to a Channel 12 news report Thursday night, Health Minister Yuli Edelstein wants to encourage widespread vaccination by offering advantages to those who take the shot, and also by limiting the options of those who don't.

"Whoever doesn't vaccinate will only go out to supermarkets or pharmacies, while the vaccinated will go to stadiums and gyms," Edelstein was quoted as saying.

The warnings come as virus infections dropped Thursday to their lowest rate since late December and the number of seriously ill patients in Israeli hospitals dipped to below 1,000 for the first time since early January, but also as the county's vaccination drive has begun to slow.
Edelstein said on Wednesday that he was considering proposing legislation that would enable employers to prevent workers who aren't vaccinated against the coronavirus from

coming in to work, and warned the rule would also apply to those in the education system. He said that education workers who refuse the vaccine may have to pay for a virus test every 48 hours if they want to keep teaching. Prime Minister Benjamin Netanyahu was quoted Thursday as telling cabinet ministers: "Whoever doesn't vaccinate endangers us all, because they can cause the health system to collapse."

The issue of vaccine hesitancy and skepticism is a growing concern as Israel's world-leading inoculation campaign has slowed in recent weeks. Officials are making moves to encourage people to get vaccines, including by combating online misinformation and planning incentives. However, earlier Thursday, Deputy Attorney General Raz Nizri warned local authorities that they aren't allowed to bar unvaccinated teachers, staff and students from entering education institutions, regardless of whether it is a private or state-affiliated institution.

"According to the current legal situation, local councils aren't allowed to take the law into their hands and independently establish rules to limit the entry of education workers into education institutions," Nizri said in a letter to municipalities' legal advisers.

Channel 12 reported Wednesday that officials are looking to limit access to gyms, hotels, restaurants and cultural and sports events for those who refuse to be vaccinated, while the inoculated will be able to enter freely. As it is legally problematic to completely ban those who do not want to take the shots, a path will be available to those with fresh negative coronavirus test results from the previous 48 hours. But health officials hope to find ways to make getting tested more difficult — thereby further encouraging more people


IVERMECTIN FOR COVID-19

61 TRIALS, 578 SCIENTISTS, 19,432 PATIENTS

32 RANDOMIZED CONTROLLED TRIALS

85% IMPROVEMENT IN 14 PROPHYLAXIS TRIALS RR 0.15 [0.09-0.25]

74% IMPROVEMENT IN 26 EARLY TREATMENT TRIALS RR 0.26 [0.16-0.43]

46% IMPROVEMENT IN 21 LATE TREATMENT TRIALS RR 0.54 [0.41-0.71]

68% IMPROVEMENT IN 23 MORTALITY RESULTS RR 0.32 [0.21-0.50]

62% IMPROVEMENT IN 32 RANDOMIZED CONTROLLED TRIALS RR 0.38 [0.27-0.53]

SUMMARY OF RESULTS REPORTED IN IVERMECTIN TRIALS FOR COVID-19. 07/05/21. IVMMETA.COM

to go for the vaccine — including charging for tests, limiting their numbers and cutting back on testing locations, the report said.

So far, 3,734,894 people have had at least the first shot of the two-dose Pfizer/BioNTech vaccine Israel is using, and 2,376,138 have had the second as well — nearly a quarter of the entire population.

But in the last four days, only about 65,000 Israelis a day have been vaccinated with their first shots, even though vaccinations are now available to all Israelis aged 16 and over.

Nonetheless, data released by the Health Ministry on Thursday showed that the number of serious COVID-19 patients in Israel has gone below 1,000 for the first time since January 10, underscoring the effect the vaccines are seemingly starting to have on serious illness. The ministry said that 5,635 cases were identified on Wednesday, with 7.5% of tests returning a positive result, and another 3,258 by Thursday afternoon.

The total cases since the pandemic started reached 714,056, including 65,730 active cases. They include 992 serious cases, including 384 in critical condition and 313 on ventilators.

The death toll reached 5,272.

On Thursday morning, some 20 percent of Israel's students went back to school in areas with low to medium coronavirus infection levels. Though some lockdown restrictions were rolled back at the beginning of the month, much of the education system remains shuttered along with most nonessential businesses.

B/RD
British
*Ivermectin*
Recommendation
Development

The
Evidence-Based
Medicine
Consultancy
Ltd

# Summary of the Clinical Trials Evidence for Ivermectin in COVID-19

Ivermectin, an anti-parasitic medicine whose discovery won the Nobel Prize in 2015, has proven, highly potent, anti-viral and anti-inflammatory properties in laboratory studies.

In the past 4 months, numerous, controlled clinical trials from multiple centers and countries worldwide are reporting consistent, large improvements in COVID-19 patient outcomes when treated with ivermectin. Several comprehensive scientific reviews of these and more recent referenced trials can be found here:

Kory et al, 2021: https://osf.io/wx3zn/
Bryant et al, 2021: https://osf.io/k37ft/
Nardeli et al, 2021: https://www.signavitae.com/articles/10.22514/sv.2021.043

Properties of Ivermectin

1) Ivermectin inhibits the replication of many viruses, including SARS-CoV-2, influenza, and others;
2) Ivermectin has potent anti-inflammatory properties with multiple mechanisms of inhibition;
3) Ivermectin diminishes viral load and protects against organ damage in animal models;
4) Ivermectin prevents transmission of COVID-19 when taken either pre- or post-exposure;
5) Ivermectin hastens recovery and decreases hospitalization and mortality in patients with COVID-19;
6) Ivermectin leads to far lower case-fatality rates in regions with widespread use.

British Ivermectin Recommendation Development (BIRD)

## Recommendation on Ivermectin for COVID-19

Dr. Tess Lawrie of the Evidence-Based Medicine Consultancy Ltd. In Bath, UK, together with a team of expert systematic reviewers, conducted a systematic review and meta-analysis of the evidence on ivermectin for covid-19.

A panel of 65 clinicians, medical researchers and patient representatives then evaluated the evidence following the World Health Organization's standard DECIDE Evidence-to-Decision Framework for recommendation development. Based on the evidence, the BIRD panel recommended the rapid implementation of ivermectin in both the prophylaxis and treatment of all phases of COVID-19 in the UK and globally.

This recommendation was shared with policy- and decision-makers, relevant health agencies, and committees in England, Scotland, Wales and Northern Ireland. Since then, BIRD has engaged in awareness raising activities, public and media outreach, as well as networking with international researchers and clinicians.

Furthermore, we encourage all regulatory agencies to review the existing evidence presented in the various systematic reviews and country case studies showing that the widespread use of ivermectin resulted in a significant reduction in cases and mortality rates. As a whole, the evidence suggests that ivermectin may be an essential and vital treatment component in achieving control of the pandemic.

### Meta Analyses to date:

Kory, P. et al., (2021). Review of the Emerging Evidence Demonstrating the Efficacy of Ivermectin in the Prophylaxis and Treatment of COVID-19. To appear in American Journal of Therpeutics, May-June 2021

Hill, A., et al., (2021). Meta-analysis of randomized trials of ivermectin to treat SARS-CoV-2 infection. Research Square preprint. DOI: 10.21203/rs.3.rs-148845/v1

Cobos-Campos, R., et al., (2021). Potential use of Ivermectin for the treatment and profilaxis. Clinical Research and Trials, 7, 1-5. DOI: 10.15761/CRT.1000333 (over-ridden)

Bryant, A., Lawrie, T.A., Dowswell, T., Fordham, E.J., Mitchell, S., Hill, S.R. & Tham, T.C. (2021). Ivermectin for prevention and treatment of COVID-19 infection: a systematic review and meta-analysis. OSF preprint, https://osf.io/k37ft/ DOI: 10.31219/osf.io/k37ft

Castañeda-Sabogal, A., et al. (2021). Outcomes of Ivermectin in the treatment of COVID-19: a systematic review and meta-analysis. medRxiv preprint, DOI: 10.1101/2021.01.26.21250420

Nicolas, P., Maia, M. F., Bassat, Q., Kobylinski, K. C., Monteiro, W. & Rabinovich, N. R. (2020). Safety of oral ivermectin during pregnancy: a systematic review and meta-analysis.
8, E92 – E100. doi: https://doi.org/10.1016/S2214109X(19)30453-X

Navarro, M. et al. (2020). Journal of Antimicrobial Chemotherapy. Safety of high-dose ivermectin: a systematic review and meta-analysis. DOI: 10.1093/jac/dkz524

Reviews to date:

Crump, A. (2017). Ivermectin: enigmatic multifaceted 'wonder' drug continues to surprise and exceed expectations. The Journal of Antibiotics, 70,495-505. doi: 10.1038/ja.2017.11

Heidary, F. & Gharebaghi, R. (2020). Ivermectin: a systematic review from antiviral effects to COVID-19 complementary regimen., 73, 593–602. doi: 10.1038/s41429-020-0336-z

Nardelli, P.., et al., (2021). Crying wolf in time of Corona: the strange case of ivermectin and hydroxychloroquine. Is the fear of failure withholding potential life-saving treatment from clinical use? Signa Vitae DOI: 10.22514/sv.2021.043

Schmith, V. D., Zhou, J. (J. & Lohmer, L. R. (2020). Clinical Pharmacology and Therapeutics, The Approved Dose of Ivermectin Alone is not the Ideal Dose for the Treatment of COVID-19. DOI: https://doi.org/10.1002/cpt.1889

Caly, L., et al., (2020). The FDA-approved drug ivermectin inhibits the replication of SARS-CoV-2 in vitro. Antiviral Research, 178\, 104787. DOI: https://doi.org/10.1016/j.antiviral.2020.104787

Quick Facts

1. Meta-analysis of 13 trials, assessing 1892 participants, found that ivermectin reduced the risk of 240 death by an average of 68% compared with no ivermectin treatment.

2. Meta-analysis of 3 trials, assessing 738 participants, found that ivermectin prophylaxis among health care workers and covid-19 contacts probably reduces the risk of covid-19 infection by an average of 86%.

3. Ivermectin has a well-established safety profile with billions of doses of ivermectin having been used worldwide for parasitic indications. Various WHO documents on parasitic infections refer to ivermectin's long safety record.

4. Ivermectin is affordable, and can be distributed by various means, e.g. post, and self-administered. It can therefore effectively reach traditionally 'hard-to-reach' and vulnerable populations such as undocumented migrants, homeless, the elderly living alone or in care homes, those lacking transport to reach health facilities, and those who lack access to adequate health care for other reasons.

EbMC Squared CiC

The Evidence-Based Medicine Consultancy Ltd

Research for Impact

## Medicines and Healthcare Products Regulatory Agency • June 9, 2021

Dear Dr. Raine,
RE: Urgent preliminary report of Yellow Card data up to 26th May 2021

As the Director of the Evidence-based Medicine Consultancy Ltd and EbMC Squared CiC, I am writing to share with you this urgent preliminary report on the Yellow Card data up to 26th May 2021. Please note that EbMC Squared CiC is a Community Interest Company that conducts research mandated by the public and funded by public donations. We have no conflicts of interest and do not engage in industry-funded work.

The MHRA describes the purpose of its Yellow Card system as providing "an early warning that the safety of a medicine or a medical device may require further investigation. It is important for people to report problems experienced with medicines or medical devices as these are used to identify issues which might not have been previously known about."1

Furthermore, the MHRA recognises that the conditions under which medicines are studied in clinical trials do not reflect how the medicines will be used in hospitals or clinical practice once they are rolled out. This means that some adverse drug reactions "may not be seen until a very large number of people have received the medicine."

The Covid-19 vaccines were rolled out in the UK on the 8th of December 2020. As of the 6th May 2021 nearly 39 million people have received their first dose of the Covid-19 vaccine, and 24 million both doses. Sufficient data have now accumulated to get a good overview of adverse
drug reactions (ADRs). I would, therefore, like to draw your attention to the high number of covid-19 vaccine-attributed deaths and ADRs that have been reported via the Yellow Card system between the 4th January 2021 and the 26th May 2021. In total, 1,253 deaths and 888,196 ADRs (256,224 individual reports) were reported during this period.

1. https://yellowcard.mhra.gov.uk/the-yellow-card-scheme/

To facilitate a better clinical understanding of the nature of the adverse events occurring, primarily to inform doctors at the frontline, we have searched the Yellow Card reports us-

ing pathology-specific key words to group the data according to the following five broad, clinically relevant categories:

A. Bleeding, Clotting and Ischaemic ADRs
B. Immune System ADRs
C. 'Pain' ADRs
D. Neurological ADRs
E. ADRs involving loss of Sight, Hearing, Speech or Smell
F. Pregnancy ADRs

After running each search, we entered the results into an Excel spreadsheet, excluding ADRs that were clearly irrelevant or appeared in duplicate.

These spreadsheets will be used going forward to facilitate the weekly monitoring of Yellow Card data. We recognise that keywords may need expanding to capture category relevant ADRs that may have been missed in this preliminary ADR scope and analysis.

### **A**. Bleeding, Clotting and Ischaemic Adverse Drug Reactions (Table 1).
### We used the following SEARCH TERMS to identify bleeding, clotting and ischaemic ADRs: bleed, haemo*, thrombo*, emboli*, coag*, death, ischaem*, infarct*, angina, stroke, cerebrovascular, CVA.

We included the term 'death' in this search group, as this term accounted for many reported fatalities (438) without specific details. Given the large number of fatalities without a specific cause of death, we considered that ADRs reported in this way, in particular as 'sudden death', would be most likely to occur from haemorrhagic, thrombo-embolic or ischaemic events. Given the seriousness of this ADR, we considered it justifiable to do this pending a Freedom of Information (FOI) request to clarify the cause of death in these 438 people.

Using these search terms, 13,766 bleeding, clotting and ischaemic ADRs were identified – 856 of which were fatal. Government reports have highlighted the occurrence of cerebral venous sinus thrombosis, apparently accounting for 24 fatalities and 226 ADRs up to the 26th May 2021.

However, our analysis indicates that thromboembolic ADRs have been reported in almost every vein and artery, including large vessels like the aorta, and in every organ including other parts of the brain, lungs, heart, spleen, kidneys, ovaries and liver, with life-threatening and life-changing consequences. The most common Yellow Card categories affected by these sorts of ADRs were the nervous system (152 fatalities, mainly from brain bleeds and clots), respiratory (with 103 fatalities, mainly from pulmonary thromboembolism) and cardiac categories (81 fatalities).

## **B**. Immune System Adverse Drug Reactions (Infection, Inflammation, Autoimmune, Allergic) (Table 2)

We used the following SEARCH TERMS to identify immune system ADRs: INFECTION (category), IMMUNE DISORDERS (category), -itis; immun, multiple sclerosis, lupus, myasthenia, pernicious, diabetes, Addison, Crohn's, Coeliac, Graves, alopecia, amyloidosis, antiphospholipid, angioedema, Behcet's, pemphigoid, psoriasis, aplasia, sarcoidosis, scleroderma, thrombocytopenia, vitiligo, Miller Fisher, Guillain-Barre; allerg*, urticaria, rash, eczema, asthma.

To the 26th May, a total of 54,870 ADRs and 171 fatalities fell into this category, which comprised the second most common cause of post-vaccination fatalities after 'Bleeding, Clotting and Ischaemic ADRs'. However, only 4 associated fatalities were reported under the Yellow card 'IMMUNE DISORDERS' category, with the majority (141 fatalities associated with 19,474 ADRs) reported under the 'INFECTIONS' category. Among 1,187 people for whom post-vaccination COVID infection was reported, there were 72 fatalities (6% of reported COVID infection ADRs).

Many 'INFECTION' category ADRs indicated the occurrence of re-activation of latent viruses, including Herpes Zoster or shingles (1,827 ADRs), Herpes Simplex (943 ADRs, 1 fatal), and Rabies (1 fatal ADR) infections. This is strongly suggestive of vaccine-induced immune-compromise. Bell's palsy, also associated with latent virus re-activation, is reported in the Neurological ADRs section of this report (D). Also suggestive of vaccine-induced immunocompromise was the high number of immune-mediated conditions reported, including Guillain-Barré Syndrome (280 ADRs, 6 deaths), Crohn's and non-infective colitis (231 ADRs, 2 deaths) and Multiple Sclerosis (113 ADRs).
Allergic responses to the vaccines comprised 25,270 reported ADRs, with 4 fatalities occurring among 1,001 people experiencing anaphylactic reactions.

## **C.** 'Pain' Adverse Drug Reactions
We used the following SEARCH TERMS to identify pain ADRs: pain, -algia.

Pain ADRs accounted for at least 157,579 ADRs (18%) in total. A large number of these were arthralgias (joint pains – 24,902 ADRs) and myalgias (muscle pains – 31,168 ADRs), including fibromyalgia (270 ADRs), a long-term condition that causes pain all over the body. Among Congenital Disorders (usually conditions present from birth) there were 11 reports of Paroxysmal Extreme Pain Disorder (PEPD), which is an extremely rare inherited disease caused by a genetic mutation leading to dysfunction of voltage-gated sodium channels. The head was the most common location for pain, but abdominal pain, eye pain, chest pain, pain in extremities, and anywhere else that pain can be imagined was reported. Headaches were reported more than 90,000 times and were associated with death in four

people (excluding deaths reported to be from other causes, that may also have involved headache).

## D. Neurological Adverse Drug Reactions

In addition to examining ADRs in the NERVOUS SYSTEM DISORDERS (category), we used the following SEARCH TERMS to identify neurological ADRS specifically involving paralysis, neurological degeneration, and convulsive ADRs as follows: (paralysis), palsy, paresis, neuropathy, incontinence, Guillain-Barre, Miller Fisher, multiple sclerosis; (neurodegeneration) encephalopathy, dementia, ataxia, spinal muscular atrophy, delirium, Parkinson; (seizure), convuls, seizure, fit, epilepsy.

Twenty-one percent (185,474) of ADRs were categorized as Nervous System Disorders in the Yellow Card system. A wide variety of neurological ADRs were noted, including 1,992 ADRs involving seizures and 2,357 ADRs involving some form of paralysis, including Bell's palsy (626 ADRs). Other ADRs involving encephalopathy (18), dementia (33), ataxia (34), spinal muscular atrophy (1), Parkinson's (18) and delirium (504) may reflect post-vaccination neurodegenerative pathology.

The majority of fatalities associated with Nervous System ADRs occurred as a result of central nervous system haemorrhages – 127 fatalities out of the 186 fatalities reported as Nervous
System fatalities. These 127 have been counted in group A (Bleeding, clotting and Ischaemic ADRs).

More information is needed to determine the extent of the morbidity associated with this alarmingly large category of ADRs. Access to the full Yellow Card database and consultation with clinical specialists, along with follow up of these reports, is urgently needed.

## E. Adverse Drug Reactions involving loss of sight, hearing, speech or smell
## We used the following SEARCH TERMS: speech, taste, smell, olfactory, blind, sight, visual, vision, deaf, hearing.

There were 4,771 reports of visual impairment including blindness, 130 reports of speech impairment, 4,108 reports of taste impairment, 354 reports of olfactory impairment, and 704 reports of hearing impairment.

## F. Pregnancy Adverse Drug Reactions

Given that vaccinated pregnant women comprise a small proportion of the vaccinated population in the UK up to 26th May 2021, there appear to be a high number of Pregnancy

ADRs (307 ADRs), including one maternal death, 12 stillbirths (reported as 6 stillbirths and 6 foetal deaths, but only 3 listed as fatal(?)), one newborn death following preterm birth, and 150 spontaneous abortions. We have submitted a FOI request as to the cause of the maternal death and will look into pregnancy and congenital ADRs in more detail in our next report.

## Limitations of this rapid report

This report is not comprehensive, and analysis of Yellow Card data is ongoing. The process of defining the search terms was iterative and we trust that it provides a basis for discussion among clinicians and scientists. We have not compared the frequencies of ADRs between different vaccines; however, our impression is that ADRs were not limited to any particular vaccine brand (AstraZenenca, Pfizer and Moderna) or type (mRNA and DNA) currently used in the UK. UK ADR data mirror data reported on the World Health Organization's pharmacovigilance database:
www.Vigiaccess.org

On the latter, most reported ADRs to date (941,774 ADRs and 5,474 deaths) have occurred among individuals in the 18 to 44 years and 45 to 64 years of age categories (38% and 35%, respectively); the vast majority (72%) of reported ADRs have occurred among women. Unfortunately, we have been unable to examine the UK Yellow Card data according to age and gender due to lack of data availability.

We are aware of the limitations of pharmacovigilance data and understand that information on reported Adverse Drug Reactions should not be interpreted as meaning that the medicine in question generally causes the observed effect or is unsafe to use. We are sharing this preliminary report due to the urgent need to communicate information that should lead to cessation of the vaccination roll out while a full investigation is conducted. According to the recent paper by Seneff and Nigh (1), potential acute and long-term pathologies include:

1. Pathogenic priming, multisystem inflammatory disease and autoimmunity
2. Allergic reactions and anaphylaxis
3. Antibody dependent enhancement
4. Activation of latent viral infections
5. Neurodegeneration and prion diseases
6. Emergence of novel variants of SARSCoV2
7. Integration of the spike protein gene into the human DNA

The nature and variety of ADRs reported to the Yellow Card System are consistent with the potential pathologies described in this paper and supported by other recent scientific

papers on vaccine-induced harms, which are mediated through the vaccine spike protein product (2,3). It is now apparent that these products in the blood stream are toxic to humans. An immediate halt to the vaccination programme is required whilst a full and independent safety analysis is undertaken to investigate the full extent of the harms, which the UK Yellow Card data suggest include thromboembolism, multisystem inflammatory disease, immune suppression, autoimmunity and anaphylaxis, as well as Antibody Dependent Enhancement (ADE).

Due to the need for expedience, we have not detailed all ADRs in this preliminary report. The existing Yellow Card data covering just under a five-month period indicate that the extent of morbidity and mortality associated with the COVID-19 vaccines is unprecedented.

Age and gender specific data, as well as the time from vaccination, are required to further our analysis of these data and we have sent Freedom of Information Requests (FOIRs) to the MHRA in this regard.

In addition, urgent independent expert evaluation and discussion is required to assess whether the novel vaccines may be causing gene mutations among recipients, as suggested by the occurrence of usually extremely rare genetic disorders, such as Paroxysmal Extreme Pain Disorder (PEPD). In addition to the 11 cases of PEPD on the Yellow Card system, there are currently 12 reports of this extremely rare condition on the WHO's Vigiaccess.org database and 10 on the European Medicines Agency's (EUDRA) pharmacovigilance database. Are these ADRs occurring in babies of vaccinated pregnant women, or spuriously among vaccinated adults? This question needs urgent attention. As pharmacovigilance data are known to be substantially under-reported, we recommend that the MHRA urgently publicises these ADR data and assists people with their ADR reporting, to facilitate full elucidation and clarification of the extent of the problem.

The MHRA now has more than enough evidence on the Yellow Card system to declare the COVID-19 vaccines unsafe for use in humans. Preparation should be made to scale up humanitarian efforts to assist those harmed by the COVID-19 vaccines and to anticipate and ameliorate medium to longer term effects. As the mechanism for harms from the vaccines appears to be similar to COVID-19 itself, this includes engaging with numerous international doctors and scientists with expertise in successfully treating COVID-19.

There are at least 3 urgent questions that need to be answered by the MHRA:

1 How many people have died within 28 days of vaccination?
2 How many people have been hospitalised within 28 days of vaccination?
3 How many people have been disabled by the vaccination?

EbMC Squared CiC remains at your service to assist with further analysis. We kindly request full access to the Yellow Card database with immediate effect to enable a comprehensive, independent and accurate evaluation of the Yellow Card data, which will be undertaken in collaboration with clinical experts.

Yours sincerely,

Dr. Tess Lawrie (MBBCh, PhD)
Director, Evidence-based Medicine Consultancy Ltd
and EbMC Squared CiC Bath, UK

Oxford University Press for the Infectious Diseases Society of America
June 23rd, 2021

# Circulating SARS-CoV-2 Vaccine Antigen Detected in the Plasma of mRNA-1273 Vaccine Recipients

By Alana F. Ogata†1,2,3, Chi-An Cheng†1,2,3, Michaël Desjardins†3,4,5, Yasmeen Senussi1, Amy C. Sherman3,4, Megan Powell4, Lewis Novack4, Salena Von4, Xiaofang Li6, Lindsey R. Baden*3,4,6, David R. Walt*1,2,3

1. Department of Pathology, Brigham and Women's Hospital, Boston, MA, USA
2. Wyss Institute for Biologically Inspired Engineering, Harvard University, USA
3. Harvard Medical School, Boston, MA, USA
4. Division of Infectious Diseases, Brigham and Women's Hospital, Boston, MA, USA
5. Division of Infectious Diseases, Centre Hospitalier de l'Université de Montréal Montreal, QC, Canada
6. Center for Clinical Investigation, Brigham and Women's Hospital, Boston, MA, USA

*These authors contributed equally. †These authors contributed equally
Corresponding author: David R. Walt • email: dwalt@bwh.harvard.edu

## ABSTRACT

SARS-CoV-2 proteins were measured in longitudinal plasma samples collected from 13 participants who received two doses of mRNA-1273 vaccine. 11 of 13 participants showed detectable levels of SARS-CoV-2 protein as early as day one after first vaccine injection. Clearance of detectable SARS-CoV-2 protein correlated with production of IgG and IgA.

## INTRODUCTION

Messenger RNA (mRNA) vaccines for coronavirus disease 2019 (COVID-19) have been widely deployed in the US and are highly effective at inducing protection against infection and severe disease1. In December 2020, the Food and Drug Administration gave emergency use authorization (EUA) to the mRNA-1273 vaccine (ModernaTX, Inc), as a two 100 µg dose regimen 28 days apart. mRNA-1273 encodes the severe acute respiratory syndrome coronavirus (SARS-CoV-2) spike antigen with a transmembrane anchor and S1-S2 cleavage site2. Data have demonstrated the elicitation of binding and neutralization antibodies against the spike protein by the mRNA-1273 vaccine in humans, thereby inferring that spike protein was produced and induced an immune response2–5. However, critical data demonstrating the direct production of spike protein via translation from the mRNA-1273 vaccine in these studies are missing, precluding a full understanding of the vaccine mech-

anism. Here, we provide evidence that circulating SARS-CoV-2 proteins are present in the plasma of participants vaccinated with the mRNA-1273 vaccine. We report antigen and serological data of the mRNA-1273 vaccine in 13 healthcare workers at the Brigham and Women's Hospital. Ultrasensitive single-molecule array (Simoa) assays were used for the detection of SARS-CoV-2 antigens spike (S1-S2 unit), S1, and nucleocapsid and antibodies IgG, IgA, and IgM against SARS-CoV-2 spike, S1, receptor binding domain (RBD), and nucleocapsid, as previously described6,7. The ultralow detection limits of the **Simoa** assays enable detection of antigen and antibody production in the early stages post vaccination and quantification of changes in levels over the course of both vaccine injections.

## MATERIALS AND METHODS

A prospective pilot study of 13 healthcare workers, 18 years and older, with no known history of SARS-CoV-2 infection was conducted at the Brigham and Women's Hospital from December 2020 to March 2021.Full description of study design reported in the Supplementary Materials. SARS-CoV-2 antigens and antibodies were measured using single-molecule array assays, as described in the Supplemental Materials (Methods, Figure S1, Table S2- S4).

## RESULTS

Plasma was collected from 13 participants at 10-13 timepoints between 1 and 29 days after the first injection and 1-28 days after the second injection. There was an equal balance of sex, median age was 24 years old, and participants from varied racial and ethnic groups were included (Supplemental Table S1). None of the participants reported prior COVID-19 infection. Temporal profiling of SARS-CoV-2 antigens and antibodies were acquired using Simoa assays as previously described6,7, providing data on 15 markers to monitor antigen production and immune responses on each participant (Supplemental Figure S2 to S14). The Simoa antigen assays for spike, S1, and nucleocapsid were previously validated in plasma from pre-pandemic healthy subjects, pre-pandemic patients with respiratory infections, COVID-19 negative patients, and COVID-19 positive patients.7 Authors detected S1 and N in 64% of COVID-19 positive patients and S1 levels were significantly associated with disease severity. Here, antigens S1 and spike were measured to probe mRNA translation, while nucleocapsid antigen served as a negative control (Figure 1A, B, C, Supplemental Table S5). After the first 100 µg dose, the mRNA-1273 vaccine produced detectable levels of S1 antigen in plasma in 11 participants and spike antigen was detected in three of 13 participants. Nucleocapsid antigen was undetectable or at background levels in all participants after both injections, as expected.

S1 antigen was detected as early as day one post vaccination and peak levels were detected on average five days after the first injection (Figure 1A). The mean S1 peak levels was

68 pg/mL ±21 pg/mL. S1 in all participants declined and became undetectable by day 14. No antigen was detected at day zero for 12 of 13 participants, as expected. However, one individual presented detectable S1 on day zero, possibly due to assay cross reactivity with other human corona-viruses or asymptomatic infection at the time of vaccination. Spike protein was detectable in three of 13 participants an average of 15 days after the first injection. The mean spike peak level was 62 pg/mL ± 13 pg/mL. After the second vaccine dose, no S1 or spike was detectable, and both antigens remained undetectable through day 56. For one individual (Participant #8), spike was detected at day 29, one day after the second injection and was undetectable two days later.

Plasma antibodies IgG, IgA, and IgM were measured against spike, S1, RBD, and nucleocapsid. Antibody levels measured on day zero represent the baseline level in each participant, all who had no previous report of COVID-19 infection. In all 13 participants, as expected, IgG levels against spike and S1, and RBD increased after the first injection while IgG against nucleocapsid showed no change over time (Figures 1D, E, F; individual participant data are shown in Supplemental Figures S2-S14). IgA is involved in early neutralization activity and is therefore crucial to target potentially short-lived IgA responses8. Our Simoa assays detected increased IgA against spike, S1, and RBD after the first injection (Supplemental Figure S2-S15). Nine participants (such as participants #3, #4, #5, and #7, Figure 1G) presented measurable IgG levels against S1 and spike by day 14 after the first vaccine injection. Four participants (participants #1, #6, #10, #13, Supplemental Figure S2, S7, S11, and S14), showed a delayed IgG-S1 and IgG-spike response, which did not increase until day 28 after the first injection. Nonetheless, all participants showed additional boost in IgG-S1 after the second injection.

## DISCUSSION

In this study, 11 participants exhibit S1 antigen in plasma after the first injection, while nucleocapsid concentrations are insignificant in all participants, confirming that the detected S1 originates from vaccination and not natural infection. The presence of S1 is likely due to the nature of the encoded mRNA-1273 spike protein, which contains a cleavable S1- S2 site and enables release of S1 from the spike trimer2. We hypothesize that release of S1 protein could result from cleavage via mammalian cell proteases or circulating proteases. We observe an increase in S1 over an initial period of one to five days, suggesting that mRNA translation begins immediately after vaccine inoculation. Interestingly, spike protein appears in three of thirteen participants on average eight days after S1 is produced. The Simoa antigen assays for the full spike protein are designed to require antibody binding to both the S1 and S2 subunits for detection, resulting in a cleaved spike protein to be undetectable. Additionally, spike protein concentrations in plasma of vaccinated participants may be below our assay limit of detection. We hypothesize that the cellular immune responses triggered by T-cell activation, which would occur days after the vaccination, lead

to direct killing of cells presenting spike protein and an additional release of spike into the blood stream9. The mechanisms underlying release of free S1 and the subsequent detection of the intact spike protein remain unclear and require further studies. We additionally present corresponding antibody data that are consistent with serological studies done in large trials2–5,10–12 to support our antigen results. Here, the Simoa serological assays are sensitive enough to identify the production of antibodies at early stages post vaccination and to profile antibody dynamics for each participant at high resolution. IgG and IgA against S1, spike, and RBD increase after S1 production in all participants.

There is no significant increase in IgG and IgA against nucleocapsid, confirming that the immune response was specific to the vaccine, which does not contain mRNA for nucleocapsid. For all participants, the increase in IgG against S1 and spike directly corresponds to the decline in S1 or spike protein by the second injection. The inverse correlation between antibody and antigen levels observed is consistent with previous studies investigating SARS-CoV-2 natural infection, in which patients with severe COVID-19 with high plasma antigen levels exhibited antigen clearance upon production of antibodies7.

Our Simoa antigen assays cannot detect antigen-antibody immune complexes. Although S1 protein is present in most participants, serological data shows that some participants exhibit an initial enhancement in antibody levels by day 14 compared to those who do not show an enhancement until day 28. These differences in antibody dynamics could be explained by early antibody production due to previous asymptomatic infection, which has recently been demonstrated in seropositive participants10. Here, we observe two participants (Participants #3, #4) with high IgG-spike baseline levels compared to all other participants who produce increased IgG-spike levels by day 14.

Limitations of the current study include the small sample size and potential biases that result from enrolling healthy, young adults, which may not be representative of the general population. Future studies should also examine the dynamics of antigen production with neutralization antibodies. Nonetheless, evidence of systemic detection of spike and S1 protein production from the mRNA-1273 vaccine is significant and has not yet been described in any vaccine study, likely due to limitations in assay sensitivity and timing assessment.

The clinical relevance of this finding is unknown and should be further explored. These data show that S1 antigen production after the initial vaccination can be detected by day one and is present beyond the site of injection and the associated regional lymph nodes. Induction of IgG and IgA immune responses can be detected as early as day five post vaccination and are associated with clearance of spike and S1 antigen in the systemic circulation.

REFERENCES

(1) Baden LR, El Sahly HM, Essink B, et al. Efficacy and Safety of the mRNA-1273 SARS-CoV-2 Vaccine. N Engl J Med, 2021; 384: 403-416.
(2) Jackson LA, Anderson EJ, Rouphael NG, et al. An mRNA Vaccine against SARS- CoV-2 — Preliminary Report. N Engl J Med, 2020; 383: 1920-1931.
(3) Anderson EJ, Rouphael NG, Widge AT, et al. Safety and Immunogenicity of SARS- CoV-2 mRNA-1273 Vaccine in Older Adults. N Engl J Med, 2020; 383: 2427-2438.
(4) Widge AT, Rouphael NG, Jackson LA, et al. Durability of Responses after SARS- CoV-2 MRNA-1273 Vaccination. N Engl J Med, 2021; 384: 80-82.
(5) Saadat S, Tehrani ZR, Logue J, er al. Binding and Neutralization Antibody Titers After a Single Vaccine Dose in Health Care Workers Previously Infected With SARS-CoV- 2. J Am Med Assoc, 2021; DOI: 10.1001/jama.2021.3341.
(6) Norman M, Gilboa T, Ogata AF, et al. Ultrasensitive High-Resolution Profiling of Early Seroconversion in Patients with COVID-19. Nat Biomed Eng, 2020; 4: 1180- 1187.
(7) Ogata AF, Maley AM, Wu C, et al. Ultra-Sensitive Serial Profiling of SARS-CoV-2 Antigens and Antibodies in Plasma to Understand Disease Progression in COVID-19 Patients with Severe Disease. Clin Chem, 2020; 4: 1180-1187.
(8) Sterlin D, Mathian A, Miyara M, et al. IgA Dominates the Early Neutralizing Antibody Response to SARS-CoV-2. Sci Transl Med, 2021; 13: 2223.
(9) Sewell HF, Agius RM, Kendrick D, Stewart M. Covid-19 Vaccines: Delivering Protective Immunity. BMJ, 2020; 371: m4838.
(10) Krammer F, Srivastava K, Alshammary H, et al. Antibody Responses in Seropositive Persons after a Single Dose of SARS-CoV-2 mRNA Vaccine. N Engl J Med, 2021; 1- 2.
(11) Wu K, Werner AP, Moliva JI, et al. mRNA-1273 Vaccine Induces Neutralizing Antibodies against Spike Mutants from Global SARS-CoV-2 Variants. BioRxiv [Preprint]. January 25, 2021. Available from: https://doi.org/10.1101/2021.01.25.427948.
(12) Corbett KS, Edwards DK, Leist SR, et al. SARS-CoV-2 mRNA Vaccine Design Enabled by Prototype Pathogen Preparedness. Nature, 2020; 86: 567-571.

# 5G radiation and the COVID-19 pandemic: Coincidence or causal relationship

By Martin L. Pall, Professor Emeritus of Biochemistry and Basic Medical Sciences
Washington State University

Two documents reprinted on [1], each argue that there are reasons to think that 5G radiation is greatly stimulating the coronavirus (COVID-19) pandemic and therefore, an important public health measure would be to shut down the 5G antennae and particularly the small cell 5G antennae in close proximity to our homes, schools, businesses, house of worship and hospitals.

The first of these documents [1] published by Miller et al., concerns the impact of 5G radiation on the immune system of the body and also suggests that 5G radiation may also

Table 1: COVID-19, cases and deaths in four regions of Northern Italy, March 26, 2020

| Region | # of cases | # of deaths | Deaths/ cases | 5G ? |
|---|---|---|---|---|
| Lombardia | 34,889 | 4,861 | 13.9% | yes |
| Emilia Romagna | 10,816 | 1,174 | 10.9% | no |
| Piemonte | 6,534 | 449 | 6.9% | no |
| Veneto | 6,935 | 287 | 4.1% | no |

increase the replication of the virus. In both of these ways, 5G radiation may be expected to make the COVID-19 pandemic much worse.

The second of these documents [1] is my own and is derived from a larger document on 5G radiation effects [2]. It starts with the history of 5G in Wuhan, China, the epicenter of the COVID-19 epidemic. Wuhan is China's first 5G "smart city" and is the location of China's first 5G highway where 5G radiation is being used to test self-driving vehicles. Approximately 10,000 5G antennae were installed and activated in Wuhan in 2019, with approximately 75 to 80% of these installed and activated in the last 2 1⁄2 months of the year. The epidemic was first detected near the beginning of that 2 1⁄2 month period and became vastly more severe, with extremely large increases in numbers of cases and in deaths by the end of 2019. That may, of course be coincidental. The death rate in other parts of China from COVID-19 infections has been substantially lower than that in Wuhan with its unparalleled high numbers of 5G antennae (Xu et al., BMJ 2020; 368:m606) – that of course could also be coincidental.

South Korea, which became the site of the worst epidemic outside of China, has large numbers of 5G antennae all over the country. The Milan area of Italy, currently, the worst epicenter in Europe also is a 5G center. And Seattle area, which was the worst area in the U.S. is also a major 5G area. New York City has become the largest epicenter in the US is another 5G site. These non-Chinese epidemic areas are not discussed in my paper, but these findings are accurate. Again, the locations of these epicenters in 5G areas may be coincidental.

These figures add to the argument that 5G radiation may have a substantial role in exacerbating the COVID-19 pandemic – they are not definitive however and we must look to the mechanism of action of EMFs and the evidence that other EMFs produce similar, if less severe effects which are similar to but less severe than what we are apparently seeing following 5G exposure.

Electromagnetic fields, including the highly pulsed and therefore highly dangerous 5G millimeter wave radiation, act via activation of voltage-gated calcium channels (VGCCs) with

Professor Martin L. Pall
Professor Emeritus of Biochemistry and Basic Medical Sciences
Washington State University

VGCC activation producing five different effects, each of which have roles in stimulating the replication and spread of coronaviruses [1,2]:

1. Excessiveintracellularcalcium
2. Oxidativestress
3. NF-kappaBelevation
4. Inflammation
5. Apoptosis(programmedcelldeath)

The predominant cause of death in the COVID-19 epidemic, is pneumonia and each of these five effects also have roles in pneumonia, such that each of them is predicted to greatly increase the percent of people dying in this epidemic. It seems highly plausible that 5G radiation is greatly increasing the spread of the epidemic and also the death rate in individuals that are infected.
You may wish to consider all of this in conjunction with the broader findings with regard to the dangers of 5G and other effects apparently produced by 5G exposures [2].

How then did we get to this state? Many independent scientists, including myself, have argued that there should be no 5G rollout until there is extensive biological safety testing of genuine 5G radiation with all of its dangerous modulating pulses. However the industry

has refused to get independent 5G testing and the FCC and other regulatory agencies have refused to require such testing. Furthermore, the EMF "safety guidelines" which are supposed to protect us from health impacts of EMF radiation have been shown, based on eight different types of highly repeated studies, to fail massively to predict biological effects. They therefore fail to predict safety [3]. It follows from this that all assurances of safety based on these "safety guidelines" are fraudulent. Consequently, there is no evidence whatsoever of 5G safety and much evidence of lack of safety.
It is my opinion, therefore, that 5G radiation is greatly stimulating the coronavirus (COVID-19) pandemic and also the major cause of death, pneumonia and therefore, an important public health measure would be to shut down the 5G antennae, particularly the small cell 5G antennae in close proximity to our homes, schools, businesses, houses of worship and hospitals. I will list some of my professional qualifications following the citations.

Martin L. Pall, Professor Emeritus of Biochemistry and Basic Medical Science
Washington State University

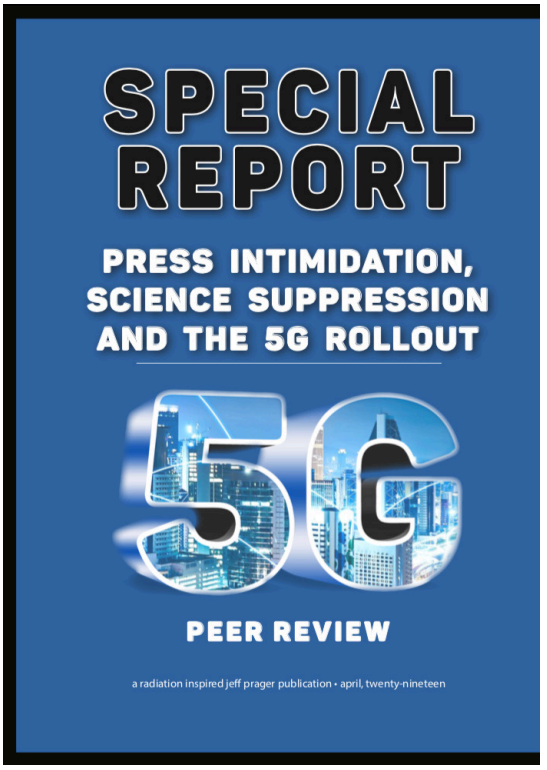
[1] http://www.electrosmogprevention.org/international-electrosmog-prevention-news/coronavirus5g/
[2] http://www.electrosmogprevention.org/wp-content/uploads/2020/03/M.Pall_.Predicted-effects-5G-Coronavirus.pdf
[3] https://ehtrust.org/wp-content/uploads/SafetyGuidelineFraud2.pdf

The VGCC activation mechanism has been amazingly well accepted in the scientific literature.

My first (2013) paper on it was placed on the Global Medical Discovery web site as one of the top medical papers of 2013. That paper has been cited 256 times according to the Google Scholar database. Most new scientific paradigms are only slowly accepted and this is much, much faster than usual.

I have given 59 invited professional talks on this topic in 15 countries, including 4 prestigious keynote addresses. I had been scheduled to give 1 more prestigious keynote address in April (has been postponed because of COVID- 19).

Two of my papers, my neuropsychiatric paper and my Wi-Fi paper, are each described by the publishing journal as being the most often downloaded paper in the history of each journal – stunning scientific interest in both papers. My recent talks, one sponsored by the Dept. of Engineering and Applied Science at Queens University and the other at the World Congress on Physics in Berlin (where I was given a certificate of recognition) show together that both engineers and physicists are starting to realize the importance of this mechanism.




Repeated Wi-Fi studies show that Wi-Fi causes oxidative stress, sperm/testicular damage, neuropsychiatric effects including EEG changes, apoptosis, cellular DNA damage, endocrine changes, and calcium overload. Each of these effects are also caused by exposures to other microwave frequency EMFs, with each such effect being documented in from 10 to 16 reviews. Therefore, each of these seven EMF effects are established effects of Wi-Fi and of other microwave frequency EMFs. Each of these seven is also produced by downstream effects of the main action of such EMFs, voltage-gated calcium channel (VGCC) activation. While VGCC activation via EMF interaction with the VGCC voltage sensor seems to be the predominant mechanism of action of EMFs, other mechanisms appear to have minor roles. Minor roles include activation of other voltage-gated ion channels, calcium cyclotron resonance and the geomagnetic magnetoreception mechanism. Five properties of non-thermal EMF effects are discussed. These are that pulsed EMFs are, in most cases, more active than are non-pulsed EMFs; artificial EMFs are polarized and such po- larized EMFs are much more active than non-polarized EMFs; dose-response curves are non-linear and non-monotone; EMF effects are often cumulative; and EMFs may impact young people more than adults. These general findings and data presented earlier on Wi-Fi effects were used to assess the Foster and Moulder (F&M) review of Wi-Fi. The F&M study claimed that there were seven important studies of Wi-Fi that each showed no effect. However, none of these were Wi-Fi studies, with each differing from genuine Wi-Fi in three distinct ways. F&M could, at most conclude that there was no statistically significant evidence of an effect. The tiny numbers studied in each of these seven F&M-linked studies show that each of them lack power to make any substantive conclusions.

In conclusion, there are seven repeatedly found Wi-Fi effects which have also been shown to be caused by other similar EMF exposures. Each of the seven should be considered, therefore, as established effects of Wi-Fi.

Free to download or read online:
https://www.academia.edu/38536620/SPECIAL_REPORT_Press_Intimidation_Science_Suppression_and_The_5G_Rollout

# Preparing for the Crises after COVID-19

## Systematic Foresight as a Tool for Evidence-informed Precautionary Policy

By Lars Brozus

Political decision-makers are regularly confronted with a large number of hypothetical crises. State and society expect them to make appropriate provisions to tackle these scenarios simultaneously. However, adequate preparation for all conceivable incidents in the future far exceeds the available resources. Decision-makers must therefore determine which of these imaginary crises should take priority. Factors such as the public visibility and likelihood of an expected crisis and the damage it is anticipated to cause play an important role in this decision. Also at play are analogy-based reasoning and political intuition. COVID-19 illustrates that these future heuristics entail significant decision-making risks. Despite many warnings about the consequences the spread of infectious diseases could have globally, hardly any state was adequately prepared. Taking credible predictions through systematic foresight into account would help decision-makers to set priorities for prevention that would be easier to explain and justify.

The new coronavirus continues to wreak havoc globally. More than 48 million people are currently reported as being infected with COVID-19 and more than 1.2 million have died. The number of unreported cases is likely to be significantly higher. The World Food Programme fears that as a result of the corona crisis, the number of starving people could increase by 120 million by the end of 2020. According to estimates by the International Monetary Fund, the combined economic losses of this and the next year will amount to roughly $11 trillion worldwide. In its macroeconomic projections for the euro area, the European Central Bank foresees a decline in GDP of up to eight percent in 2020, while the combined budget deficits of the 19 countries could reach close to one trillion euros – an increase of almost ten percent.

### Dual Crisis of Connectivity and Governance

In contrast to the global financial crisis of 2008, policy coordination has generally been lacking during the pandemic. Regions initially barely affected by COVID-19 soon suffered the consequences of lockdown and quarantine decisions taken elsewhere. The collapse of production, trade and tourism, suspended mobility and capital outflows hit the Global South especially hard. The industry-specific concentration of production capacities in a small number of locations exacerbated the undersupply of pharmaceuticals and personal protective equipment, even in the Global North. The result: a real connectivity crisis – the

negative externalities of global interdependence are unsettling politics, economy and society the world over.

The crisis of connectivity is also accompanied by a governance crisis. The role played by multilateral institutions in crisis management is virtually non-existent. So far, neither the UN or the G20 and G7 have provided significant policy guidance. Health protection and economic aid measures are decided upon predominantly nationally. Even within the EU, several borders were closed without coordination between member states.

## Lack of Preparation, Despite Warnings

Yet, the pandemic is not a black swan, i.e. a completely unexpected event having a major impact on an unprepared world. Over the past decade, governmental and non-governmental bodies have frequently issued warnings of an imminent pandemic that could have serious global consequences, including the World Health Organization (WHO). In Germany, reference is often made to a Federal Office for Civil Protection and Disaster Relief (BBK) report which looks at a "Pandemic caused by Virus Modi-SARS" and was published in 2012 by the Bundestag. Bill Gates gave a TED talk in 2015 warning against a pandemic. Another example of such foresight is the annual Global Risks Report of the World Economic Forum (WEF), which featured the spread of infectious diseases in 2019.

Better preparation for the pandemic would have involved only a fraction of the cost of having to deal with its consequences. At the Munich Security Conference in 2017, Bill Gates put the cost of adequate pandemic preparedness worldwide at $3.4 billion per year. At the same conference, he estimated the losses that would be incurred if no measures were taken at up to $570 billion annually – a very conservative sum from today's perspective. The storage of sufficient quantities of protective equipment and diagnostic material in conjunction with better preparation of the health care system, including hospitals being provided with more intensive care units, would have significantly increased the chances of early containment of the virus – and saved lives.

## Too Many Conceivable Crises

Apparently, the warnings were ignored. So the question of why better provisions were not made has gained public prominence. However, blaming the lack of preparedness on the ignorance of policymakers alone would be too simple. It fails to acknowledge that in everyday politics, countless warnings, suggestions and ideas compete for the attention of decision-makers. Over the years, besides the Modi-SARS pandemic, the BBK discussed many other hypothetical events for which Germany should be prepared: extreme melt flooding, severe winter storms, a surge in storms, the release of radioactive materials from a nuclear power plant, release of chemical substances, and drought. In addition to the spread of in-

fectious diseases, the WEF's Global Risks Report 2019 named a variety of phenomena that could develop into global crises. These included failure to mitigate climate change, proliferation of weapons of mass destruction, cyberattacks, water shortages and the formation of speculative bubbles in financial markets. The WEF reports for the years before (and after) 2019 pointed to several other important risks that also required political attention.

In addition to BBK and WEF, many institutions and agencies publish comprehensive risk reports and crisis warnings. Preparing adequately for all these hypothetical risks would overtax state resources and capacities. Decision-makers must therefore choose which crises to prepare for. Typical criteria for such decisions are the probability of the event occurring and the expected extent of the damage it may cause. However, it is notoriously difficult to give an accurate estimate of when an anticipated risk will actually materialise. The 2019 WEF report, for example, put the spread of infectious diseases in 10th place in terms

of impact. However, its list of ten risks with the highest probability of occurrence does not include infectious diseases – as is also the case in the Global Risks Report 2020.

But there have also been several instances of false positives – a prediction that did not come true – over the years. In 2009, the WHO sounded the alarm over swine flu (H1N1 virus). For the first time in over 40 years, a pandemic was officially declared. The warnings turned out to be inaccurate and were later subject to a parliamentary investigation by the Council of Europe that accused health authorities of causing unjustified panic and wasting public resources. Crying wolf can be politically costly.

## Future Heuristics in Everyday Politics

In addition to calculating the impact and likelihood of a probable future risk, decision-makers therefore rely on political intuition and simple future heuristics. Three factors are important in this context: past experience, which is processed using analogical reasoning; the significance a future risk is expected to have in the public debate; and the likelihood of a political solution for the risk, which ideally should be attributed to the policymaker in power.

Analogies are typically used by decision-makers to reflect on lessons learned from history. Because of the complexity of understanding the past, including incomplete information and biased judgment, analogies can lead to wrong conclusions. The current pandemic illustrates this point. Over the past two decades there have been several out-breaks of infectious diseases. Two of these were caused by pathogens from the corona-virus family: SARS (2003) and MERS (2012). However, in both instances the expected global spread of the virus did not materialise. Fortunately, predictions of thousands of deaths and sustained economic disruption did not turn out to be true.

Given that, in policymaking, the past is very often the default predictor of things to come, it is not surprising that many decision-makers concluded that preparations for a pandemic were not a priority. Following the logic of political trade-offs between limited resources for prevention and the public visibility of potential crises, which could translate into political pressure, decision-makers would tend to draw the analogy that elaborate and costly measures to prepare for future virus outbreaks need not be high up the precautionary agenda. As a result, the pandemic risk posed by pathogens was, once again, neglected.

But not everywhere. Governments in countries that were significantly affected by the outbreaks of SARS and MERS drew a different conclusion. South Korea and Taiwan, for instance, invested in health care preparation for a future virus epidemic. Politically, this was justifiable because both societies had been exposed to significant vulnerability in the past. In the current pandemic, both countries are benefiting from these decisions as they are faring comparatively well. There was even a political reward, as the effective management of COVID-19 is considered an important factor in the unexpected success of President Moon's governing party in South Korea's parliamentary elections in April.

## Better Preparation through Foresight

Reversing this reasoning, it can be assumed that global health policy will be given considerably more attention and resources in the future. This is, of course, long overdue. However, it does not solve the fundamental problem that too many risks continue to compete for political attention. This problem is further exacerbated by the foreseeable budget cuts that will reduce governments' leeway for distributive policies. In fact, the discussion about the areas that must be protected from budget cuts is already well underway. In Germany, organisations and institutions in the field of security policy were among the first to warn against cuts to their budgets.

And indeed, their protagonists can give good reasons for taking a defensive stance against the threat of auserity measures. Of course, nobody knows how great the risk of military confrontation in Europe actually is and which precautionary measures are warranted.

But what if we could know? Scientific studies show that the accuracy of predictions of future events (the so-called forecasts) can be systematically increased. If policymakers would learn to trust methodical forecasting, better informed decisions could be made about which events to prepare for.

This would make political disputes over prevention priorities more objective, improve the quality of public debate and promote evidence-based precautionary policies.

These studies are based on the analyses of a multi-year research project in which several

thousand people, both laymen and professionals, have participated since 2011. The project is designed to allow the participants make as many predictions as possible about hypothetical political events. Participants are simply asked to answer questions and encouraged to update their answers as they see fit. Current examples of such questions could be: Will Donald Trump hold on to presidential powers after 20 January 2021? Will Russia leave the Open Skies treaty as soon as the USA withdraws? Will world economic growth be positive in the second quarter of 2021?

An evaluation of more than 880,000 forecasts shows that some participants make the right predictions much more often than others. The top two percent of participants achieved this over several years. If these consistently above-average performers are assembled in teams, their combined forecast accuracy increases even more. The best teams achieve about 30 percent higher prediction accuracy than peer groups with access to classified information. Forecasting accuracy can be further improved through training.

This does not mean that it will be possible to anticipate all future post-corona crises. However, a 30 percent increase in accuracy implies that the number of crises for which preparations should be made would be significantly reduced. Cost-intensive and unpopular precautionary measures, in particular, would be easier to justify to a possibly sceptical public – especially if non-state actors and non-state institutions are also involved in the deliberations.

## Institutionalisation of Systematic Foresight

Systematic foresight could quite easily be institutionalised in government agencies. Foreign Services would be obvious entry points for integrating foresight training and practice in the daily bureaucratic routines. Over time, it would be possible to build up a pool of methodically trained diplomats tasked with regularly making predictions. This is not very far removed from everyday practice in a Foreign Service. An important task of diplomacy is, of course, to deal with and prepare for conceivable developments. Increasing the accuracy of predictions would give diplomats' recommendations for action more weight in decision-making.

At the international level, systematic foresight could be institutionalised in multilateral contexts. Foresight is traditionally the task of nation-states. This automatically limits the field of vision. Taking multiple interests and perspectives into account would broaden it. Multi-perspective foresight could transcend national positions and help to identify global challenges earlier and with greater accuracy. In 2019, France and Germany launched the Alliance for Multilateralism to improve global governance. Systematic foresight could be a very promising instrument to support the achievement of this worthy goal.

# WE'RE NOW AT RECORD NUMBERS OF DEATHS, THEY ARE PILING UP ON DAYS 1, 2 & 3 AN INTERVIEW WITH DR. PETER MCCULLOUGH

https://www.bitchute.com/video/9ikd7drH8n6S/

# The Wuhan Laboratory Origin of SARS-CoV-2 and the Validity of the Yan Reports Are Further Proved by the Failure of Two Uninvited "Peer Reviews"

By Li-Meng Yan (MD, PhD)1, Shu Kang (PhD)1, Jie Guan (PhD)1, Shanchang Hu (PhD)1

1. Rule of Law Society & Rule of Law Foundation, New York, NY, USA
Correspondence: team.lmyan@gmail.com

Opening Statement

A year has passed since the COVID-19 pandemic first started. Its damage so far is astonishing: 127 million people have been infected and, among them, 2.78 million died. These numbers continue to grow at a significant speed, indicating that the pandemic is far from being over. Furthermore, mutant viral strains continue to emerge, and no public policies or treatment strategies seem to be sufficiently effective in blocking COVID-19. There seems to be a consensus that the virus will not be eradicated and humans will continue to live under the influence of COVID-19 in the foreseeable future.

The defeat of humans by COVID-19 is for two fundamental reasons. First, SARS-CoV-2, the causative agent of COVID-19, is not a naturally occurring pathogen but an Unrestricted Bioweapon. It has designed and significantly enhanced functions and therefore could not be controlled easily using strategies that would normally work for naturally occurring pathogens. It is a product of the bioweapons program of the Chinese Communist Party (CCP) government, the network of which includes not only the CCP scientists but also certain overseas scientists and organizations. SARS-CoV-2 was created based on template viruses ZC45 and ZXC21, which were originally discovered in bats by scientists of the People's Liberation Army (PLA). The subsequent laboratory modifications had enabled its ability to infect humans as well as had enhanced the virus in its pathogenicity, transmissibility, and lethality.

The second fundamental reason of our defeat was that the world was made to look away from the true nature of SARS-CoV-2 and therefore responded inadequately on multiple aspects and occasions. A massive misinformation campaign has been undertaken by the CCP government to cover up the true origin of SARS-CoV-2, which involved destroying data and samples, publishing fabricated viruses on top scientific journals, controlling the narrative of the origin debate through bribed top scientists and organizations, amplifying the falsified natural origin theory through media control, labeling all other origin theories as "conspiracy theories", and defaming individuals who reveal the truth of SARS-CoV-2. As a result of the CCP's efforts here, the true, weaponized nature of

SARS-CoV-2 has been obscured and was not known by most of the public.

One example of the CCP's misinformation campaign is the defamation of the Yan reports.

On September 14th, 2020, we published our first report1, where we provided abundant scientific evidence and analyses proving that SARS-CoV-2 must not be a product of natural evolution but a product of laboratory creation. We also postulated/reconstructed, based on substantial literature evidence, a pathway for the convenient laboratory creation of SARS-CoV-2. On October 8th, 2020, we published our second report2, where we used scientific evidence and logical analyses to uncover a large-scale, organized scientific fraud committed by the CCP laboratories and orchestrated by the CCP government. This fraud clearly indicates that SARS-CoV-2 is not a natural occurring virus or a simple gain-of-function product that accidentally leaked out from a laboratory. Rather, it must be a deceiving, non-traditional bioweapon created by the CCP regime.

We also refuted the claim that the virus was derived from a virus from a mine in Mojiang. Furthermore, the fact that certain fabrications preceded the initial outbreak of COVID-19 suggests that the release of the SARS-CoV-2 must be intentional.

Our two reports were published on zenodo.org as preprint articles. We chose this site and this format because we were fully aware of the censorship on the laboratory origin of SARS-CoV-2 imposed by the top scientists of the field – peer review would not allow our report to be published as it is in a timely manner or at all.

The transparency and expedited publication process offered by zenodo, however, were necessary and appropriate in this situation – Dr. Yan and the rest of us wanted the truth of SARS-CoV-2 to be known by the rest of the world as early as possible. Furthermore, peer review is not a guarantee for scientific quality or truthfulness3-7, which is a view shared by many experts, including Dr. Anthony Fauci.

After the publication of our first report, within ten days, two uninvited "peer reviews" were published8,9. As shown in the rest of the document, these reviews were completely mistaken and intentionally misleading. However, they were published on well-known platforms and were produced by "reviewers" who hold high academic titles and are affiliated with prestigious institutions. It was a fine display of the status of personnel and organizations engaged in the CCP's scientific misinformation.

However, before diving into details of these "peer reviews", let us travel back in time and take a quick tour to review Dr. Yan's journey since the beginning of the COVID-19 pandemic as well as some early events in the origin "debate".

## A brief timeline

On December 31st, 2019, Dr. Yan, a virologist and a then core team member of the WHO H5 Reference Laboratory and the State Key Laboratory of Emerging Infectious Diseases of China at the University of Hong Kong School of Public Health, conducted a secret investigation on the outbreak in Wuhan. On Jan 16th, 2020, Dr. Yan conducted a second investigation. On both occasions, Dr. Yan used her personal connections inside China's research and hospital systems, including PLA laboratories and hospitals, and the CDC. Through communications with them, Dr. Yan learned first-hand information of the emerging COVID-19 disease, including its severity and scale of spread. She also learned how the CCP government was hiding such information from the public, which was deeply worsening the situation. Dr. Yan then gave timely feedback to her supervisors, professors Leo LM Poon and Malik Peiris, who are top coronavirus experts and core consultants of the WHO. She had hoped that certain actions would be taken internationally to pressure the CCP government to act responsibly. However, no such actions took place. Instead, Dr. Yan was warned repeatedly by professor Poon that she "should not cross the red line" and, "if not, would be disappeared".

At the same time, Dr. Yan also obtained intelligence information about the true identity of the SARS- CoV-2 virus – a bioweapon created by the Chinese military. She then verified this herself by analyzing the genetic information of the virus shared on the database using her own expertise in virology and biology. While chasing the initial sequence information, Dr. Yan also noticed that strange changes were made to the earliest deposited SARS-CoV-2 sequence. The first version of the genomic sequence, which was uploaded on January 12th was strangely mistaken. It was then quickly withdrawn and replaced by the second version (MN908947.2) on Jan 14th, which was largely correct. It is noteworthy that, on January 13th, Thailand reported the first case of infection outside China, which entails that sequence information would be obtained by the outside world and no longer under the full control of the CCP government. What is also noteworthy is that the first version was not accessible on the database for a long while until it reappeared (MN908947.1), surprisingly, free of the severe errors that it had carried previously. Finally, on January 17th, a third version was uploaded and some missing nucleotides were added to the sequence (MN908947.3). The intelligence information, the genetic evidence, the severity of the disease, and the cover-up by the CCP government convinced Dr. Yan that a public health crisis may be forthcoming.

This great sense of urgency compelled Dr. Yan to seek alternative avenues to let this information go out to the public. Her hope was, once again, to alert the world and trigger certain international pressure to make the CCP government act responsibly, which may then prevent a global health crisis. On Jan 19th, 2020, she anonymously shared this information on the LUDE Media, a YouTube channel that broadcasts to a great Chinese audience

both inside and outside mainland China. In this broadcast10, Dr. Yan sent the following five messages:

- The virus was created in a PLA laboratory using ZC45/ZXC21 as the template.
- The CCP government is actively covering up the true information of the disease.
- There is human-to-human transmission.
- There are no wild animal intermediate hosts, and the Huanan seafood market is not the origin of the virus.
- If not controlled immediately, the virus may lead to a pandemic and, as a result, many mutants will emerge inevitably and rapidly.

The red line had been crossed. Dr. Yan knew very well then that her actions could lead to severe consequences in her personal safety. If her identity was revealed, she could be "disappeared", just like what happened to thousands of Hong Kong youths during the pro-democracy protests since June 2019. Dr. Yan did it anyways.

The effect of Dr. Yan messages was immediate and significant. The CCP government was shocked by the substantial truth in Dr. Yan's messages; it was afraid that this anonymous insider was going to expose more of its lies. With its original plans disrupted, the CCP government reacted in a hurry:

- Four hours after LUDE Media's broadcast, the CCP government tripled their official number of infections, increasing it from 62 to 198.
- A few hours later, the CCP government reported, for the first time, infections outside of Wuhan.
- It also made a nation-wide announcement elevating the infectious disease alertness to the highest level according to the Law of the People's Republic of China on the Prevention and Treatment of Infectious Diseases.
- Within one day, the CCP government admitted for the first time that there was human-to-human transmission.
- Three days later, Wuhan was put into lockdown.

At the same time, the scientific field has been mobilized. In China, Dr. Zhengli Shi, the batwoman from the Wuhan Institutes of Virology (WIV), hurried out a Nature publication (submitted on January 20th and published on February 3rd, 2020)11, where she reported a RaTG13 bat coronavirus sharing a 96.2% sequence identity with SARS-CoV-2. Since then, this RaTG13 virus has served as the founding evidence for the natural origin theory (this publication of Shi has been accessed over 1.11 million times and cited 5431 times by March 30th, 2021). Interestingly, in the same issue of Nature, a similar article was published by Dr. Yongzhen Zhang12, which described ZC45 and ZXC21 as the closest match to SARS-CoV-2 evolutionarily. However, Dr. Zhang's publication received much less attention (0.47 million accesses and 2588 citations by March 30th, 2021). On February 8th,

On Wed, May 27, 2020 at 8:13 PM Randy W SCHEKMAN <schekman@berkeley.edu> wrote:

Dear Peter,

I am part of the Rich Roberts group and helped to line-up more Laureates to join the petition to Azar and Collins.
We don't expect a response from them but we wish to make a constructive contribution to your essential work and
have resolved to help find private funds to offset your loss.

Our first success is with a foundation that makes anonymous contributions to various causes including in support
of biomedical science. I am pleased to report that this group will provide the EcoHealth Alliance a grant of $500,000
to at least partially offset the NIH funds that were withdrawn from your program. Since they wish to remain anonymous,
I will be happy to serve as the intermediary in transfer of funds to your program. We can communicate about how to
proceed.

Best wishes, Randy Schekman

Randy Schekman
HHMI Investigator
Dept. of Mol. and Cell Biology
Li Ka Shing Center
UC Berkeley
Berkeley, CA 94720-3370
(510) 642-5686

*Figure 1. Exposed email shows that an anonymous donation of $500,000 was made to EcoHealth Alliance to partially offset the NIH funds withdrawn.*

2020, Major General and bioweapon expert Dr. Wei Chen took over the leadership of the WIV. Furthermore, a compulsory regulation was put into place demanding that all manuscripts concerning SARS-CoV-2 research produced by Chinese laboratories must be first reviewed and approved by the CCP government before being submitted for publication.

Significant movements had also taken place in the scientific circle in the west. On February 19th, 2020, a statement signed by 27 experts was published on the influential journal Lancet13. In this statement, the scientists asserted a natural origin of SARS-CoV-2 and condemned "conspiracy theories" that suggested a laboratory origin of the virus. It was later revealed through exposed email exchanges that, intriguingly, their assertion on the virus' origin was accepted by the signees in the absence of any scientific discussions or supporting evidence14,15. Furthermore, the statement was organized secretly by Dr. Peter Daszak, CEO of the non-profit EcoHealth Alliance and long-term collaborator of Dr. Zhengli Shi and the WIV. In fact, it was through Daszak and EcoHealth Alliance that millions of NIH funding, which are US tax dollars, were channeled to the WIV and used presumably in military-civil fusion projects there. This conflict of interest (COI) was very likely what prompted Daszak to keep his central role in the Lancet statement under the radar. Though, the same COI somehow failed to discourage him from leading the WHO

**To:** Peter Daszak[daszak@ecohealthalliance.org]; Baric, Toni C[antoinette_baric@med.unc.edu]
**Cc:** Alison Andre[andre@ecohealthalliance.org]; Aleksei Chmura[chmura@ecohealthalliance.org]
**From:** Baric, Ralph S[/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=BB0D9CC80C184735A4E862C3BDD8A15D-RALPH S BAR]
**Sent:** Thur 2/6/2020 4:01:22 PM (UTC-05:00)
**Subject:** RE: No need for you to sign the "Statement" Ralph!!

I also think this is a good decision. Otherwise it looks self-serving and we lose impact. ralph

---

**From:** Peter Daszak <daszak@ecohealthalliance.org>
**Sent:** Thursday, February 6, 2020 3:16 PM
**To:** Baric, Ralph S <rbaric@email.unc.edu>; Baric, Toni C <antoinette_baric@med.unc.edu>
**Cc:** Alison Andre <andre@ecohealthalliance.org>; Aleksei Chmura <chmura@ecohealthalliance.org>
**Subject:** No need for you to sign the "Statement" Ralph!!
**Importance:** High

I spoke with Linfa last night about the statement we sent round. He thinks, and I agree with him, that you, me and him should not sign this statement, so it has some distance from us and therefore doesn't work in a counterproductive way.

Jim Hughes, Linda Saif, Hume Field, and I believe Rita Colwell will sign it, then I'll send it round some other key people tonight. We'll then put it out in a way that doesn't link it back to our collaboration so we maximize an independent voice.

Cheers,

Peter

**Peter Daszak**
*President*

EcoHealth Alliance
460 West 34th Street – 17th Floor
New York, NY 10001

*Figure 2. Exposed email shows Peter Daszak, Linfa Wang, and Ralph Baric purposely avoided signing the Lancet statement although Daszak eventually signed likely because of the central role he played in organizing this statement.*

The Lancet statement and the Nature Medicine article, although baseless scientifically, both concluded that SARS-CoV-2 is a natural occurring pathogen. These publications had subsequently been promoted greatly on traditional media, social media, and other platforms. The result of these combined operations was to declare to the scientific community: SARS-CoV-2 having a natural origin is the official, accepted view; any dissenting voices would be condemned and dismissed by experts of the field.

Therefore, unsurprisingly, although various scientific evidence continued to emerge pointing to the laboratory origin of SARS-CoV-2, much of such information was suppressed fairly efficiently. The public's opinion of the virus' origin remained dominated by the natural origin theory.

However, the truth was not meant to be blocked. While Dr. Yan continued to use the LUDE Media to expose various facts of COVID-19, including providing intelligence information (For example, pointing out that the Lancet statement was an organized effort to suppress the laboratory origin theories) and sharing her expert analyses on aspects of asymptomatic infections, antibody evaluation, autopsy studies, treatment strategies, vaccine de-

velopment, etc., her identity was eventually discovered by the CCP government, which forced her to leave Hong Kong. At the end of April 2020, Dr. Yan successfully escaped from Hong Kong and arrived at the US. Here she continued to reveal the truth of SARS-CoV-2 to the world. On July 10th, 2020, Dr. Yan made her first public appearance on Fox News and, since then, has been continuing to spread the truth of COVID-19 on different platforms. The CCP's defamation of Dr. Yan, which took place on both traditional media and social media involving CCP's cyber army, also started right after Dr. Yan's escape and came in huge waves continuously since then.

Uninvited "peer reviews" on our report were extremely poor scientifically and meant to mislead

On Sep 14th, 2020, Dr. Yan and the rest of us authors published our first scientific report1, presenting substantial scientific evidence and analyses to prove that SARS-CoV-2 is a product of laboratory creation. Since then, the origin of SARS-CoV-2 has become an open secret to people who have the relevant knowledge and have carefully analyzed our report, although some of these honest opinions may not have been made public for various reasons. The report has gained its fair share of attention so far, reaching over 1.1 million views and over 0.75 million downloads.

Interestingly, almost immediately after its publication, our report received "peer reviews", although uninvited, from two groups of scientists, respectively. The first review, published on September 22nd, 2020, eight days from the publication of our report, was produced by a group of four scientists from the Johns Hopkins Center for Health and Security: Kelsey Warmbrod, Rachel West, Nancy Connell, and Gigi Gronvall8. Two days later, on September 24th, a second review was published by the MIT Press, where comments came from four seemingly independent scientists: Takahiko Koyama, Adam Lauring, Robert Gallo, and Marvin Reitz9.

It has to be mentioned that no "reviews" came from the coronavirus research community. The WIV and the Academy of Military Medical Sciences (AMMS) also kept silent despite that the scientific evidence provided in our reports clearly and repeatedly pointed to them as the responsible parties for the creation of SARS-CoV-2.

Although we welcome critical reviews of our report, such reviews have to be evidence-based, logical, honest, unbiased, and produced by qualified scientists. Unfortunately, these two published "reviews" did not meet any of those criteria.

The four "reviewers" at the MIT Press showed severe misunderstanding and lack of knowledge in coronavirus biology. They practically ignored the large body of evidence and analyses in our report and, through this practice, unfairly described our report as "lack of evidence". On the other hand, their own judgements were based on a series of published

"scientific findings", which have been now proven to be fraudulent. Therefore, their review comments, which are exclusively criticisms of our report, are of no scientific strength at all.

These "reviewers" at the MIT Press also violated the rules of peer review. Dr. Roberto Gallo and Dr. Marvin Reitz published practically identical comments on multiple occasions, which indicates clearly that at least one of the two has committed plagiarism and that their review comments were not all results of independent, critical thinking.

Furthermore, the "reviewers" at the MIT Press politicized the issue when their job as "peer reviewers" was to judge the science of our scientific report in an unbiased manner. They questioned our affiliation to the Rule of Law Foundation and Rule of Law Society. Our choosing of these two organizations as our affiliation was because we appreciate their crucial assistance in Dr. Li-Meng Yan's escape from Hong Kong. The twin organizations are non-profit organizations that work to promote freedom, human rights, and equality for Chinese people. They have financed Dr. Yan's flight from Hong Kong and provided a stipend for her to get settled in the US. Without this help, Dr. Yan would not have the chance to tell the truth of COVID-19 to the world and much evidence within the Yan reports may not be revealed in a timely manner. However, importantly, the science in the Yan reports was produced solely by us four scientists and has not been altered in any way by the two foundations or their founders.

The "reviewers" at the MIT Press also questioned the timing of the publication of the first Yan report. However, the publication of our report was not the only thing that Dr. Yan did to alert the world about the public health threat of COVID-19 or the artificial nature of the SARS-CoV-2 virus. Dr. Yan first revealed these truths on January 19th, 2020. She cautioned the world then that a global pandemic would be unavoidable if her revelation about the artificial, weaponized nature of the virus was not taken seriously. Since then, through the LUDE Media, Dr. Yan continued to reveal various facts of COVID-19. After escaping from Hong Kong, Dr. Yan also went onto different platforms, for example, Fox News and Daily Mail, to continue to alert the world. The publication of the first Yan report was only one of those efforts. More importantly, like with any other manuscript, the preparation of the first Yan report, which took a significant amount of time and efforts of the four authors, followed its natural course until it reached publication quality in September 2020.

Interestingly, while criticizing the timing of our report, this MIT Press review itself was published in a hasty manner – only ten days after the publication of our report. In their comments, they also expressed, repeatedly, their doubts on our statement that we have a second report to publish. In fact, the second Yan report was published on October 8th, 20202, only 15 days after the appearance of the MIT Press "review". Apparently, it was these reviewers, not us, who felt some urgency in terms of timing.

There seems to be an intriguing question here: while the timing of Dr. Yan's actions has always been consistent with her commitment to global health and revealing the truth of COVID-19, what is behind the urgency or timing of the MIT Press in publishing the review to negate the Yan report?

The uninvited "peer review" published by the Johns Hopkins researchers are even poorer in terms of scientific vigor. These four scientists, Warmbrod, West, Connell, Gronvall, showed a complete lack of understanding in every branch of biology that was relevant to the topic. Some of their comments were plainly ignorant, which makes responding to them feel like grading exams of clueless students – they were piling up key words to get partial credits and at the same time have no idea what they are talking about.

What was even more ridiculous with Warmbrod et al.'s "review" was that, in almost every comment, these four "reviewers" intentionally distorted the original descriptions in our report. By doing so, they then invented room, which did not exist otherwise, to insert criticisms. Their actions have then falsified a scene: our report was full of mistakes and the "reviewers" themselves appeared to be superior scientists that hold the truth. The reality, however, is that they had only rudimentary understanding of the science here. Yet, they abused their tiny advantage over the public on this knowledge as well as their academic brand to fool the public and to defame our report.

When the quality of these two sets of uninvited "peer reviews" is so poor, one has to wonder why these "reviewers" would rush out their shoddy judgements publicly? Did they not realize that this is a global health issue and that the world would suffer from misinformation coming from irresponsible, unqualified scientists?
There may be some clues to this mystery.

Dr. Robert Gallo, the leading "reviewer" at the MIT Press, has deep ties to the CCP government. In 2009, the Gallo Virology Institute was established in Shandong Province, China20. Gallo is also a member of the management team for the Hong Kong-based company, Medisun Holdings Limited21. Furthermore, interestingly, on December 20th, 2020, three months after Dr. Gallo published his review criticizing our report, the CCP government gave him the VCANBIO Award for Biosciences and Medicine, one of the most prestigious awards in China22. Enormous praises were placed on Gallo when this news was reported across many media platforms. These connections and the long-term "friendship" that Gallo has with the CCP government leave little doubt on why Dr. Gallo would come out and baselessly criticize the Yan report – he should have been encouraged or even directed by the CCP government.

Based on her interview at CNNpolitics published on October 21st, 2020, Dr. Gigi Gronvall appears to be the leading figure of the Johns Hopkins "reviewers". As revealed recently23,

Gronvall was a member of the expert group, who was consulted by the US government very early on in the pandemic about the origin of SARS-CoV-2. The now-exposed email exchanges show that Gronvall and other scientists (including Peter Daszak, Kristian Andersen, Trevor Bedford, Stanley Perlman, etc) in this group formed an agreement that the virus must have come from nature despite that there is an absence of supporting evidence. Interestingly, Gronvall's actions then and her review of our report later have been consistent – she came to this conclusion in the absence of supporting evidence or analyses. Whether her past stance urged her to publish the biased, baseless review and thus muddle the water on the origin of SARS-CoV-2 is everyone's guess.

It is necessary to point out that, comparing to the enormous "scientific criticisms" that our first report has received, not a single "review" or any scientific counter-argument was made toward our second report. The same trend was seen in the media world: while news articles thrashed our first report, no news article, to the best of our knowledge, was published specifically attacking our second report. It is intriguing that whatever incentives encouraged the two uninvited "peer reviews" against our first report did not succeed in motivating anyone to "review" our second report. Given that such incentives tend to be huge, the absence of "peer review" here can be seen as a proof that our second report is even more unbeatable scientifically.

Although the two "reviews" on our first report were so poor in quality that any scientist with the proper knowledge would automatically disregard them, they did spread widely through the media. National Geographics, New York Times, and CNN, all cited these reviews, without any fact check, to criticize Dr. Yan and our report. As described previously in our response to CNN24, although CNN offered to interview Dr. Yan, it did not accommodate Dr. Yan's request that she would only do live interviews with CNN. The CCP government also put a spin on these news articles published in the western media to further defame Dr. Yan and thereby further suppress the truth of the SARS-CoV-2 origin.

This round of scientific misinformation and media manipulation, once again, caused great confusion in the general public. We therefore felt that responses from us would be beneficial as they may help the world defeat such misinformation and arrive sooner at the truth of COVID-19. So, as we have promised in our second report, here we present our point-to-point responses to the review comments from both groups of "reviewers".

This document has an excessive length in part because we often had to cite the exact words from our report to prove that the "reviewers" intentionally distorted our original descriptions. On the positive side though, on a few occasions, we did use room to further clarify certain points, which should benefit people outside the coronavirus research circle as they may not have fully appreciated certain evidence from reading our report. These issues include but are not limited to:

• Why ZC45 and ZXC21 must have been used as the template for the creation of SARS-CoV-2.
• How ~3,000 nucleotide changes (~10% of the viral genome) could be safely introduced to the template.
• Why these changes are necessary in concealing the bioweapon-nature of SARS-CoV-2.
• Whether or not these changes could bear additional designed functions, which may be associated with unique pathogenic outcomes.
• How Zhengli Shi and her important collaborators (Lanying Du, Shibo Jiang, Ralph Baric, Fang Li, etc.) learned early on the two most essential elements in Spike engineering for human infection: receptor binding and presence of human protease-cleavage site25.

(It is also worth mentioning that, Yusen Zhou, husband of Lanying Du and an AMMS expert in the understanding of immune evasion strategies of coronaviruses, suddenly passed away in summer 2020. Right before his passing, on April 29th, 2020, a manuscript was submitted by his research group to Science26. This work described the Spike N501Y mutation, which was later shown to be the determining mutation of the prevalent UK variant B.1.1.7. that emerged in the human population a few months afterwards in the fall.)

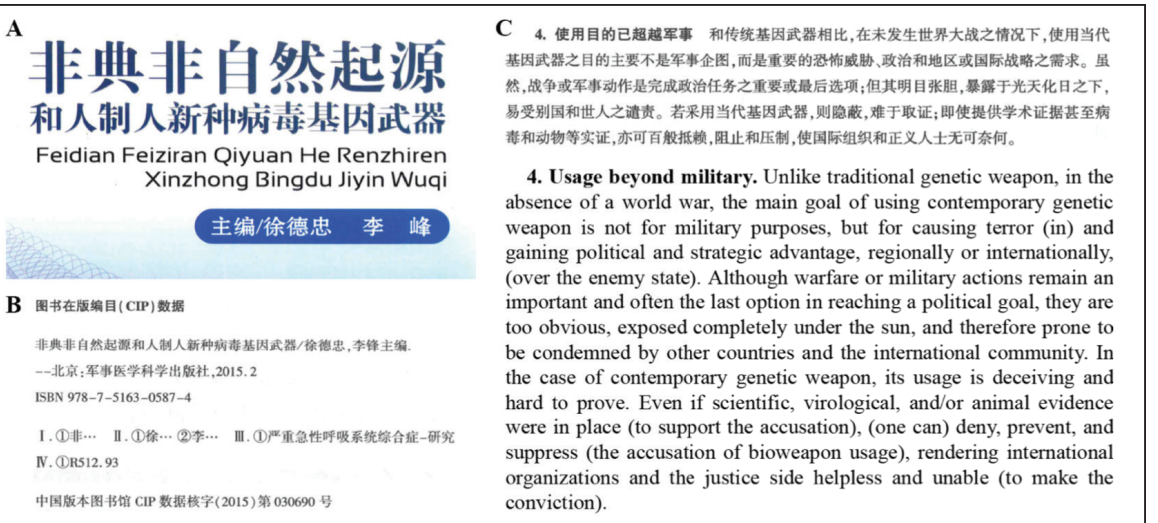
Significance in acknowledging SARS-CoV-2 as an Unrestricted Bioweapon

As shown in the remainder of the document, our responses here further prove that the science in our reports is solid and irrefutable. We urge the public and relevant governments to face the truth revealed in our reports: SARS-CoV-2 is an Unrestricted Bioweapon created by the CCP regime.

Figure 3 (at top right). The 2015 book "Unnatural Origin of SARS and Genetic Weapons Based on Artificial Human-Infectious Viruses". A) Chief editors: Dezhong Xu (Major General of PLA, leading PLA epidemiologist & SARS expert) and Feng Li (Vice Director, Health Bureau of the PLA General Logistics Department). B) Publication details. Publisher: Military Medical Science Press. C) Description of some key features of contemporary genetic weapon in Chinese (above, from Chapter 4, Page 85) and its translation in English (below).

The concept of Unrestricted Bioweapon may be new to the rest of world, but to the CCP it is not. Such a novel bioweapon had been developed by the CCP secretly for a long while, and the term "Unrestricted Bioweapon", which was first coined by us in the second Yan report, describes this novel bioweapon perfectly. In fact, the CCP did not hide its intention here. In a book published in 2015 (Figure 3), a group of CCP's military virologists/scientists headed by professor and Major General Dezhong Xu described an ideal "contemporary genetic weapon". The key features of it include:

• It would be created in a way that it is practically indistinguishable from a naturally oc-



A

非典非自然起源
和人制人新种病毒基因武器
Feidian Feiziran Qiyuan He Renzhiren Xinzhong Bingdu Jiyin Wuqi
主编/徐德忠　李　峰

B 图书在版编目(CIP)数据

非典非自然起源和人制人新种病毒基因武器/徐德忠,李锋主编.
--北京:军事医学科学出版社,2015.2
ISBN 978-7-5163-0587-4

Ⅰ.①非… Ⅱ.①徐… ②李… Ⅲ.①严重急性呼吸系统综合症-研究
Ⅳ.①R512.93

中国版本图书馆 CIP 数据核字(2015)第 030690 号

C **4. 使用目的已超越军事** 和传统基因武器相比,在未发生世界大战之情况下,使用当代基因武器之目的主要不是军事企图,而是重要的恐怖威胁、政治和地区或国际战略之需求。虽然,战争或军事动作是完成政治任务之重要或最后选项;但其明目张胆,暴露于光天化日之下,易受别国和世人之谴责。若采用当代基因武器,则隐蔽,难于取证;即使提供学术证据甚至病毒和动物等实证,亦可百般抵赖,阻止和压制,使国际组织和正义人士无可奈何。

**4. Usage beyond military.** Unlike traditional genetic weapon, in the absence of a world war, the main goal of using contemporary genetic weapon is not for military purposes, but for causing terror (in) and gaining political and strategic advantage, regionally or internationally, (over the enemy state). Although warfare or military actions remain an important and often the last option in reaching a political goal, they are too obvious, exposed completely under the sun, and therefore prone to be condemned by other countries and the international community. In the case of contemporary genetic weapon, its usage is deceiving and hard to prove. Even if scientific, virological, and/or animal evidence were in place (to support the accusation), (one can) deny, prevent, and suppress (the accusation of bioweapon usage), rendering international organizations and the justice side helpless and unable (to make the conviction).

*Figure 3. The 2015 book "Unnatural Origin of SARS and Genetic Weapons Based on Artificial Human-Infectious Viruses". A) Chief editors: Dezhong Xu (Major General of PLA, leading PLA epidemiologist & SARS expert) and Feng Li (Vice Director, Health Bureau of the PLA General Logistics Department). B) Publication details. Publisher: Military Medical Science Press. C) Description of some key features of contemporary genetic weapon in Chinese (top, Chapter 4, Page 85) and its translation in English (bottom).*

curring pathogen. This way, "even if scientific, virological, and/or animal evidence were in place (to support the accusation), (one can) deny, prevent, and suppress the accusation of bioweapon usage, rendering international organizations and the justice side helpless and unable to make the conviction".

• Its use is not restricted for military battles, but is for non-military settings where it would be "causing terror (in) and gaining political and strategic advantage, regionally or internationally, (over the enemy state)".

Combining the above descriptions with professor Ralph Baric's assessment that "you can engineer a virus without leaving any trace"27, people may finally be able to connect the dots and peel off the many layers to access the core of the COVID-19 pandemic.

(A future report from us will focus on further describing Unrestricted Bioweapons as well as proposing actions in facing the attack by such a weapon)

As revealed in our second report, the scientific misinformation and cover-up by the CCP started before the initial outbreak, which indicates that the release of the SARS-CoV-2/bioweapon was not accidental but should be intentional. Evidence suggests that the outbreak should have originated from community tests of the bioweapon that went out of control. As Dr. Yan shared through the LUDE Media on January 19th, 202010, community testing is a key step of the CCP's unrestricted bioweapons plan. The goal of community testing could include: 1) To observe the bioweapon's effect on its intended target – hu-

mans; 2) To further adapt the virus in humans and the environment and thereby give the virus a more natural look. However, due to the lack of proper animal models, the CCP scientists should have underestimated the transmissibility of SARS-CoV-2 and, as a result, the containment strategy used in the community tests somehow failed, leading to the release of this bioweapon. In a way, intentional release here refers to the conscious actions of the CCP scientists during the community tests – they took the virus out of the P3/P4 laboratory and released it in the community as part of its development. After the virus got out of hand, however, the CCP government did not really control it. Instead, it took advantage of the outbreak and made sure that the virus spread to and hurt other parts of the world by doing at least the following:

• It stopped domestic travel and yet allowed international travel from Wuhan.
• It hoarded the PPE and thereby greatly worsened the COVID-19 crisis in other countries.

Because of the CCP's long-term planning, which includes pre-installing scientific fabrications28,29 and pre-establishing relationships with certain western experts, organizations, journals, and media, the Unrestricted Biowarfare then took off conveniently around the globe and yet was sufficiently covered up.

It is also important to realize that a bioweapon could carry designed and added functions, which naturally occurring pathogens of the same kind may not have. This level of awareness should be the key in finding answers to the many unknowns of the COVID-19 disease. It needs to be investigated whether any of the following symptoms and/or phenomena, which are concerning and somewhat mysterious, be results of artificial design:

• Coagulopathy: Distinct from other viral illnesses, coagulopathy is frequently observed in COVID- 19 patients and is often life-threatening with poor prognosis30-33. COVID-19-associated coagulopathy may occur in a wide range of organs, taking the forms of arterial and venous thromboembolism or systemic microangiopathy34-38.

• Neurological damage: Many COVID-19 patients also experience neurological damage39-42, the reason for which is not known and has to be studied carefully. Interestingly, the template viruses ZC45 and ZXC21, upon their discovery, were shown by the PLA scientists to cause brain infections and inflammation in suckling rats43. Coincidentally or not, the E protein, which is associated to neurotoxicity in coronavirus infections44, was kept 100% identical between ZC45/ZXC21 and SARS-CoV-2.

• Autoimmune disorders: Overactive immune response contribute significantly to the pathogenesis of COVID-1935,36,45,46. Autoimmunedisorders secondaryto SARS-CoV-2 infections present similar clinical manifestations as systemic autoimmune diseases and may result in damages in a wide range of organs in many age groups.COVID-19-induced

autoimmune disorders include systemic lupus erythematosus (SLE)-like syndrome47-49, kawasaki-like syndrome50-53, and immune thrombocytopenic purpura (ITP)54-56.

• Long hauler: A significant percentage of infected individuals become long haulers. They develop various complications in multiple systems57-60, which adversely affect the quality of their lives and are very difficult to treat. Diagnosis for long haulers is also difficult. The medical reasons behind and molecular basis of long haulers need to be investigated thoroughly.

• Antibody-Dependent Enhancement (ADE): ADE refers to the general situation where certain antibodies generated from the infection of one viral variant may lead to harmful effects during reinfection by a different variant of the virus. ADE is a confirmed phenomenon in SARS, Dengue, and other viral infections. Studies have shown that ADE may exacerbate SARS-CoV-2 infections61-64. While mutant variants of SARS-CoV-2 continue to emerge, understanding ADE may be critical in the treatment and prevention of SARS-CoV-2 infections as well as the development of safe vaccines65.

In addition to realizing SARS-CoV-2 as an Unrestricted Bioweapon, people should also come to the realization that the CCP's Unrestricted Scientific Misinformation campaign is a significant component of this Unrestricted Biowarfare. Many people and organizations were put into work by the CCP and functioned in a highly coordinated manner, including scientific experts (CCP scientists and experts from other countries), scientific journals (Nature, Lancet, etc), research institutions (WIV, AMMS, etc), and international organizations such as the WHO. The Unrestricted Scientific Misinformation campaign not only obscured the artificial nature of SARS-CoV-2 but also led to misjudgements by individuals, governments, policy makers, or even investors, leading to greater medical, social, and economic disorders.

Importantly, this campaign is still ongoing. More "novel" animal coronaviruses are going to be published by the CCP-influenced individuals and laboratories and thereby continue to build the falsified theory of SARS-CoV-2 having a natural origin. Similarly, the CCP will continue to use scientists under its control and influence, who often hold high titles, to try to control the narratives using these fraudulent publications.

At the same time, Dr. Yan remains committed to revealing the truth of SARS-CoV-2 to the world. Honest discussions that are based on scientific facts and logic are always welcome by Dr. Yan. Dishonest and intentionally misleading arguments, like these two "reviews", will be exposed as demonstrated in this document. Dr. Yan is open for live debates on any influential platform with any scientist(s) who support the natural origin theory and/or believe that China is not where SARS-CoV-2 originated. Dr. Yan and us co-authors will also produce additional report(s) providing our analyses on important aspects of COVID- 19.

We sincerely hope that our reports, both published and upcoming, would be treated with seriousness that they deserve. We suggest so because we believe the truths in our reports can not only help the global fight against COVID-19 but also awaken the world to take actions to prevent future Unrestricted Bioweapon attacks. Ultimately, the realization of SARS-CoV-2 being an Unrestricted Bioweapon and the current pandemic an Unrestricted Biowarfare makes it clear that the CCP regime is the one responsible for this brutal attack on humanity. The CCP government must be held accountable. If not, it can only be encouraged to commit more crimes and continue to hurt the global community.

Acknowledgement

We thank Dr. Steven Quay for his kind suggestions. We also thank everyone who has contributed and continues to contribute to fighting against the scientific misinformation and revealing the true origin of COVID-19 to the world.

These reviews are now openly published, along with a response from the RR:C19 Editorial Office, that states, "Collectively, reviewers have debunked the authors' claims that: (1) bat coronaviruses ZC45 or ZXC21 were used as a background strain to engineer SARS-CoV-2, (2) the presence of restriction sites flanking the RBD suggest prior screening for a virus targeting the human ACE2 receptor, and (3) the furin-like cleavage site is unnatural and provides evidence of engineering. In all three cases, the reviewers provide counter-arguments based on peer-reviewed literature and long-established foundational knowledge that directly refute the claims put forth by Yan, et al. There was a general consensus that the study's claims were better explained by potential political motivations rather than scientific integrity."

Overall response to the "reviewers" at the MIT Press

We disagree with the "reviewers" or the editor soliciting these "reviews" on their conclusion. In fact, none of the arguments offered by the reviewers stands on solid grounds. The so-called evidence that they used to support their claims has been proven to be fraudulent1. The reviewers also showed severe deficiencies in their understanding of coronavirus biology and evolution. Their comments are baseless, careless, and misleading. As a result, their reckless behaviors have damaged the world's efforts in revealing the true origin of COVID-19. They were the ones lacking scientific integrity, not authors of the Yan reports. In fact, the Yan reports continue to stand strong because they are based on solid facts, logical and robust analyses, and scientific integrity.

Also, the reviewers baselessly stated that our report can be "explained by potential political motivations" and questioned the timing of our publication. However, the truth is the opposite: our report was not about politics but about the scientific investigation of the

true origin of the COVID-19 pandemic. The ones that are politicizing the issue are these "reviewers" led by Dr. Robert Gallo. Instead of focusing on discussing the science of our scientific report, they went out of their ways as "peer reviewers" and brought in issues that have nothing to do with science. The timing of our report was not calculated. However, it is interesting that, when the "reviewers" questioned the timing of our report, their "review" was published only ten days after our publication. This is an unbelievable speed in the world of peer review. One has to wonder what is behind the timing of the rushed publication of this "review" and what are the motivations of these "reviewers". It has to be pointed out that Dr. Gallo, the leading "reviewer" here, has close ties to the Chinese Communist Party (CCP) government. In 2009, an institute named the Gallo Virology Institute was established in Jinan, Shandong Province2.

- **The virus is transmitting from human to human.**
- **The CCP government is covering up the truth of the virus, including its human-to-human transmission and actual numbers of infections in Wuhan.**
- **The Huanan Seafood Market is a smokescreen and not where the virus originated.**
- **No intermediate, wild animal host exists.**
- **The virus will lead to a devastating pandemic if there is no timely and potent intervention.**
- **The virus is mutation-prone and new variants may emerge inevitably and rapidly.**
- **The virus is a bioweapon developed by the CCP government using the PLA-discovered ZC45/ZXC21 as the template.**

Contrary to Gallo's claim here, Dr. Yan's credibility and the timing of her actions are unquestionable. On January 19th, 2020, Dr. Yan then anonymously warned the world with the following messages [31] (Grey box above).

Dr. Gallo also has business and financial ties in Hong Kong since 20173. Furthermore, the CCP government has very recently awarded Dr. Gallo the VCANBIO Award for Biosciences and Medicine4, which is, according to the news report, "a significant and authoritative award in the life sciences and medicine field of China". It is very interesting that the award

was announced three months after Dr. Gallo published this review criticizing and defaming our report.

Although we are not obligated to respond to these biased and scientifically weak comments, we do feel that responses from us would be valuable in preventing further damage that these "review" comments might cause. In the end, it is the true origin of COVID-19 that we want the world to understand. We have therefore provided point-to-point responses below. For distinction, our responses are in black, while the reviewers' comments are in blue. References added by us are grouped at the end of Part I, also in black. Editors Note: Dr. Yan's explanation has been proven time and time again. The remaining critiques of this report and the authors responses can be read by accessing the full report at: https://www.researchgate.net/publication/350523980_The_Wuhan_Laboratory_Origin_of_SARS-CoV-2_and_the_Validity_of_the_Yan_Reports_Are_Further_Proved_by_the_Failure_of_Two_Uninvited_Peer_Reviews_Opening_Statement

References

1. COVID-19 dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University. Johns Hopkins University of Medicine Coronavirus Resource Center website. Accessed September 21, 2020. https://coronavirus.jhu.edu/map.html
2.LuanJ,JinX,LuY,ZhangL. SARS-CoV-2 Spike protein favors ACE2 from Bovidaeand Cricetidae. JMedVirol. April 1, 2020. https://doi.org/10.1002/jmv.25817
3. Anderson KG, Rambaut A, Lipkin WI, Holmes EC, Garry RF. The proximal origin of SARA-CoV-2. Nat Med. 2020;26:450-452. https://doi.org/10.1038/s41591-020-0820-9
4. Zhou P, Yang Z-L, Wang X-G, et al. A pneumonia outbreak associated with a new coronavirus of probable bat origin. Nature. 2020;579:270-273. https://doi.org/10.1038/s41586-020-2012-7
5. Leitner T, Kumar S. Where did SARS-CoV-2 come from? Mol Biol Evol. 2020;37(9):2463-2464. https://doi.org/10.1093/molbev/msaa162
6. Xia X. Extreme genomic CpG deficiency in SARS-CoV-2 and evasion of host antiviral defense. Mol Biol Evol. 2020;37(9):2699-2705. https://doi.org/10.1093/molbev/msaa094
7. Zhou H, Chen X, Hu T, et al. A novel bat coronavirus closely related to SARS-CoV-2 contains natural insertions at the S1/S2 cleavage site of the Spike protein. Curr Biol. 2020;30(11):2196-2203.e3. https://doi.org/10.1016/j.cub.2020.05.023
8. Zhang Y-Z, Holmes EC. A Genomic Perspective on the Origin and Emergence of SARS-CoV-2. Cell. 2020;181(2):223-227. https://doi.org/10.1016/j.cell.2020.03.035
9. Tang Z, Wu C, Li X, et al. On the origin and continuing evolution of SARS-CoV-2. Natl Sci Rev. 2020;7(6):1012- 1023. https://doi.org/10.1093/nsr/nwaa036
10. Yan L-M, Kang S, Guan J, Hu S. Unusual Features of the SARS-CoV-2 Genome Suggesting Sophisticated Laboratory Modification Rather Than Natural Evolution and Delineation of Its Probable Synthetic Route. New York: Rule of Law Society & Rule of Law Foundation; 2020.
11. Bat coronavirus RaTG13, complete genome. GenBank. Accessed September 21, 2020. https://www.ncbi.nlm.nih.gov/nuccore/MN996532.1
12. Oong XY, Ng KT, Takebe Y, et al. Identification and evolutionary dynamics of two novel human coronavirus OC43 genotypes associated with acute respiratory infections: phylogenetic,

spatiotemporal and transmission network analyses. Emerg Microbes Infect. 2017;6(1):1-13. https://doi.org/10.1038/emi.2016.132
13. Forni D, Cagliani R, Clerici M, Sironi M. Molecular evolution of human coronavirus genomes. Trends Microbiol. 2017;25(1):35-48. https://doi.org/10.1016/j.tim.2016.09.001
14. Stayton CT. What does convergent evolution mean? The interpretation of convergence and its implications in the search for limits to evolution. Interface Focus. 2015;5(6):20150039. https://dx.doi.org/10.1098%2Frsfs.2015.0039
15. Hu D, Zhu C, Ai L, et al. Genomic characterization and infectivity of a novel SARS-like coronavirus in Chinese bats. Emerg Microbe Infect. 2018;7:154.
https://dx.doi.org/10.1038%2Fs41426-018-0155-5
16. Cheng J, Zhao Y, Xu G, et al. The S2 subunit of QX-type infectious bronchitis coronavirus Spike protein is an essential determinant of neurotropism. Viruses. 2019;11(10):972.
https://doi.org/10.3390/v11100972
17. Jaimes JA, Millet JK, Goldstein ME, Whittaker GR, Straus MR. A fluorogenic peptide cleavage assay to screen for proteolytic activity: applications for coronavirus Spike protein activation. J Vis Exp. 2019;143:e58892. https://dx. doi.org/10.3791/58892
18. Wu Z, Yang L, Ren X, et al. ORF8-related genetic evidence for Chinese horseshoe bats as the source of human severe acute respiratory syndrome coronavirus. J Infect Dis. 2016;213(4):579-583. https://doi.org/10.1093/infdis/jiv476
19. Muth D, Corman VM, Roth H, et al. Attenuation of replication by a 29 nucleotide deletion in SARS-coronavirus acquired during the early stages of human-to-human transmission. Sci Rep. 2018;8:15177. https://doi.org/10.1038/s41598-018-33487-8
20. Flower TG, Buffalo CZ, Hooy RM, Allaire M, Ren X, Hurley JH. Structure of SARS-CoV-2 ORF8, a rapidly evolving coronavirus protein implicated in immune evasion. Preprint. bioRxiv. Posted August 27, 2020. Accessed September21,2020.
https://www.biorxiv.org/content/10.1101/2020.08.27.270637v1.full.pdf
21. Lan J, Ge J, Yu J, et al. Structure of the SARS-CoV-2 Spike receptor-binding domain bound to the ACE2 receptor. Nature. 2020;581:215-220. https://doi.org/10.1038/s41586-020-2180-5
22. Mou H, Quinlan BD, Peng H, et al. Mutations from bat ACE2 orthologs markedly enhance ACE2-Fc neutral- ization of SARS-CoV-2. Preprint. bioRxiv. Posted June 30, 2020. Accessed September 21, 2020. https://dx.doi.org/10.1101%2F2020.06.29.178459
23. Gülpinar Ö, Güçlü AG. How to write an review article? Turk J Urol. 2013;39(suppl 1):44-48. https://dx.doi.org/10.5152%2Ftud.2013.054
24. Lokman SM, Rasheduzzaman M, Salauddin A, et al. Exploring the genomic and proteomic variations of SARS- CoV-2 spike glycoprotein: a computational biology approach. Infect Genet Evol. 2020;84:104389. https://dx.doi.org/10.1016%2Fj.meegid.2020.104389
25. Higginbottom A, Quinn ER, Kuo C-C, et al. Identification of amino acid residues in CD81 critical for interaction with hepatitis C virus envelope glycoprotein E2. J Virol. 2000;74(8):3642-3649. https://doi.org/10.1128/ jvi.74.8.3642-3649.2000
26. Kimalov B, Gal=on A, Stav R, Belausov E, Arazi T. Maintenance of coat protein N-terminal net charge and not primary sequence is essential for zucchini yellow mosaic virus systemic infectivity. J Gen Virol. 2004;85(110):3421- 3430. https://doi.org/10.1099/vir.0.80417-0
27. Qu X-X, Hao P, Song X-J, et al. Identification of two critical amino acid residues of the severe acute respiratory syndrome coronavirus Spike protein for its variation in zoonotic tropism transition via a double substitution strate- gy. J Biol Chem. 2005;280:29588-29595.

https://doi.org/10.1074/jbc.M500662200
28. Xu D, Zhang Z, Wang F-S. SARS-associated coronavirus quasispecies in individual patients. N Engl J Med. 2004;350:1366-1367. https://doi.org/10.1056/NEJMc032421
29. Bentley K, Evans DJ. Mechanisms and consequences of positive-strand RNA virus recombination. J Gen Virol. 2018;99(10):1345-1356. https://doi.org/10.1099/jgv.0.001142
30. Worobey M, Holmes EC. Evolutionary aspects of recombination in RNA viruses. J Gen Virol. 1999;80(10):2535- 2543. https://doi.org/10.1099/0022-1317-80-10-2535
31. Simon-Loriere, EC Holmes. Why do RNA viruses recombine? Nat Rev Microbiol. 2011;9:617-626. https://doi.org/10.1038/nrmicro261464
32. Yuan S, Jiang S-C, Li Z-L. Analysis of possible intermediate hosts of the new coronavirus SARS-CoV-2. Front Vet Sci. 2020;7:379. https://dx.doi.org/10.3389%2Ffvets.2020.00379
33. Parrish CR, Murcia PR, Holmes EC. Influenza virus reservoirs and intermediate hosts: dogs, horses, and new possi- bilities for influenza virus exposure of humans. J Virol. 2015;89(6):2990-2994. https://doi.org/10.1128/JVI.03146-14
34. Naffakh N, van der Werf S. April 2009: an outbreak of swine-origin influenza A(H1N1) virus with evidence for human-to-human transmission. Microbes Infect. 2009;11(8-9):725-728. https://doi.org/10.1016/j.mi-cinf.2009.05.002
35. Ren W, Li W, Yu M, et al. Full-length genome sequences of two SARS-like coronaviruses in horseshoe bats and genetic variation analysis. J Gen Virol. 2006;87(Pt 11):3355-3359. https://doi.org/10.1099/vir.0.82220-0
36. Herrara S, Reyes-Herrara PH, Shank TM. Predicting RAD-seq marker numbers across the Eukaryotic Tree of Life. Genome Biol Evol. 2015;7(12):3207-3225. https://doi.org/10.1093/gbe/evv210
37. New England BioLabs Inc. Frequencies of restriction sites. Accessed September 21, 2020. https://www.neb.com/ tools-and-resources/selection-charts/frequencies-of-restriction-sites
38. New England BioLabs Inc. Furin. Accessed September 21, 2020. https://www.neb.com/products/p8077-furin#Product%20Information
39. Hoffman M, Kleine-Weber H, Pöhlmann S. A multibasic cleavage site in the Spike protein of SARS-CoV-2 is essential for infection of human lung cells. Mol Cell. 2020;78(4):779-784.e5. https://doi.org/10.1016/j.mol-cel.2020.04.022
40. National Institutes of Health. Dual use research of concern. Accessed September 21, 2020. https://osp.od.nih.gov/biotechnology/dual-use-research-of-concern/
41. Thao TTN, Labroussaa F, Ebert N, et al. Rapid reconstruction of SARS-CoV-2 using a synthetic genomics plat- form. Nature. 2020;582;561-565. https://doi.org/10.1038/s41586-020-2294-9
42. ThermoFisher Scientific. Cloning troubleshooting guide. Accessed September 21, 2020. https://www.thermofisher.com/us/en/home/life-science/cloning/cloning-learning-center/invitrogen-school-of-molecular-biology/molecular-cloning/cloning/cloning-troubleshooting-guide.html
43. Vela Diagnostics. ViroKey SARS-CoV-2 RT-PCR test v1.0 (EUA). Accessed September 21, 2020. https://www.veladx.com/product/qpcr-respiratory-viruses/virokey-sars-cov-2-rt-pcr-test.html
44. Neumann G, Fujii K, Kino Y, Kawaoka Y. An improved reverse genetics system for influenza A virus generation and its implications for vaccine production. Proc Natl Acad Sci U S A. 2005;102(46):16825-16829. https://doi.org/10.1073/pnas.0505587102

45. Almazán F, Sola I, Zuñiga S, et al. Coronavirus reverse genetic systems: infectious clones and replicons. Virus Res. 2014;189:262-270. https://dx.doi.org/10.1016%2Fj.virusres.2014.05.026
46. Siridechadilok B, Gomutsukhavadee M, Sawaengpol T, et al. A simplified positive-sense-RNA virus con- struction approach that enhances analysis throughput. J Virol. 2013;87(23):12887-12674. https://dx.doi.org/10.1128%2FJVI.02261-13
47. Lee JY, Bae S, Myoung J. Generation of full-length infectious cDNA clones of Middle East respiratory syndrome coronavirus. JMicrobiolBiotechnol.2019;29(6):999-1007. https://doi.org/10.4014/jmb.1908.08004
48. Vashee S, Stockwell TB, Alperovich N, et al. Cloning, assembly, and modification of the primary human cytomeg- alovirus isolate toledo by yeast-based transformation-associated recombination. mSphere. 2017;2(5):e00331-17. https://dx.doi.org/10.1128%2FmSphereDirect.00331-17
49. Liao C-L, Lai MMC. RNA recombination in a coronavirus: recombination between viral genomic RNA and transfected RNA fragments. J Virol. 1992;66(10):6117-6124. Accessed September 21, 2020. https://jvi.asm.org/content/66/10/6117.short
50. Kouprina N, Larionov V. TAR cloning: perspectives for functional genomics, biomedicine, and biotechnology. Mol Ther Methods Clin Dev. 2019;14:16-26. https://doi.org/10.1016/j.omtm.2019.05.006
51. Takayama K. In vitro and animal models for SARS-CoV-2 research. Trends Pharmacol Sci. 2020;41(8):513- 517. https://doi.org/10.1016/j.tips.2020.05.005
52. Warmbrod KL, Patterson EI, Kautz TF, et al. Viral RNA-dependent RNA polymerase mutants display an altered mutation spectrum resulting in attenuation in both mosquito and vertebrate hosts. PLoS Pathog. 2019;15(4):e1007610. https://dx.doi.org/10.1371%2Fjournal.ppat.1007610
53. Mandary MB, Masomian M, Poh CL. Impact of RNA virus evolution on quasispecies formation and virulence. Int J Mol Sci. 2019;20(18):4657.https://doi.org/10.3390/ijms20184657
54. Mair CM, Ludwig K, Herrmann A, Sieben C. Receptor binding and pH stability — how influenza A virus hemag- glutinin affects host-specific virus infection. Biochim Biophys Acta Biomembr. 2014;1838(4):1153-1168. https://doi. org/10.1016/j.bbamem.2013.10.004
55. Hanley KA. The double-edged sword: how evolution can make or break a live-attenuated virus vaccine. Evolution (N Y). 2011;4(4):635-643. https://dx.doi.org/10.1007%2Fs12052-011-0365-y
56. Eckels KH, Scott RM, Bancroft WH, et al. Selection of attenuated dengue 4 viruses by serial passage in primary kidney cells. V. Human response to immunization with a candidate vaccine prepared in fetal rhesus lung cells. Am J Trop Med Hyg. 1984;33(4):684-689. https://doi.org/10.4269/ajtmh.1984.33.684
57. Ogando NS, Ferron F, Decroly E, Canard B, Posthuma CC, Snijder EJ. The curious case of the nidovirus exo- ribonuclease: its role in RNA synthesis and replication fidelity. Front Microbiol. 2019;10:1813. https://dx.doi.org/10.3389%2Ffmicb.2019.01813
58. Peck KM, Lauring AS. The complexities of viral mutation rates. J Virol. 2018;92(14):e01031-17. https://doi.org/10.1128/JVI.01031-17
59. Lee N, Lui GCY, Wong KT, et al. High morbidity and mortality in adults hospitalized for respiratory syncytial virus infections. Clin Infect Dis. 2013;57(8):1069-1077. https://doi.org/10.1093/cid/cit471
60. World Health Organization. Ebola virus disease: latest numbers as of 21 June 2020. Ac-

cessed September 21, 2020. https://www.afro.who.int/health-topics/ebola-virus-disease
61. Rieg G, Lewis RJ, Miller LG, Witt MD, Guerrero M, Daar ES. Asymptomatic sexually transmitted infections in HIV-infected men who have sex with men: prevalence, incidence, predictors, and screening strategies. AIDS Patient Care STDS. 2008:22(12):947-954. https://dx.doi.org/10.1089%2Fapc.2007.0240
62. Marimoutou C, Ferraro J, Javelle E, Deparis X, Simon F. Chikungunya infection: self-reported rheumatic mor- bidity and impaired quality of life persist 6 years later. Clin Microbiol Infect. 2015;21(7):688-693. https://doi.org/10.1016/j.cmi.2015.02.024
References for Part II:
1. Yan, L.-M., Kang, S., Guan, J. & Hu, S. Unusual Features of the SARS-CoV-2 Genome Suggesting Sophisticated Laboratory Modification Rather Than Natural Evolution and Delineation of Its Probable Synthetic Route. Zenodo.org (preprint), http://doi.org/10.5281/zenodo.4028830 (2020).
2. Warmbrod, K.L., West, R.M., Connell, N.D. & Gronvall, G.K. In Response: Yan et al Preprint Examinations of the Origin of SARS-CoV-2. John Hopkins Center for Health Security, https://www.centerforhealthsecurity.org/our-work/pubs_archive/pubs-pdfs/2020/200921-in-response-yan.pdf (2020).
3. Zhang, B. Repost: SARS-CoV-2 Could Come from a Lab - A Critique of "The Proximal Origin of SARS- CoV-2" Published in Nature Medicine -. LinkedIn, https://www.linkedin.com/pulse/repost-sars-cov-2-could-come-from-lab-critique-proximal-billy-zhang/ (2020).
4. Bengston, D. All journal articles evaluating the origin or epidemiology of SARS-CoV-2 that utilize the RaTG13 bat strain genomics are potentially flawed and should be retracted. OSF-Preprints, DOI:10.31219/osf.io/wy89d (2020).
5. Yan, L.-M., Kang, S., Guan, J. & Hu, S. SARS-CoV-2 Is an Unrestricted Bioweapon: A Truth Revealed through Uncovering a Large-Scale, Organized Scientific Fraud. Zenodo.org (preprint), http://doi.org/10.5281/zenodo.4073131 (2020).
6. Ren, W. et al. Difference in receptor usage between severe acute respiratory syndrome (SARS) coronavirus and SARS-like coronavirus of bat origin. J Virol 82, 1899-907 (2008).
7. Menachery, V.D. et al. A SARS-like cluster of circulating bat coronaviruses shows potential for human emergence. Nat Med 21, 1508-13 (2015).
8. Kuo, L., Godeke, G.J., Raamsman, M.J., Masters, P.S. & Rottier, P.J. Retargeting of coronavirus by substitution of the spike glycoprotein ectodomain: crossing the host cell species barrier. J Virol 74, 1393- 406 (2000).
9. Yount, B. et al. Reverse genetics with a full-length infectious cDNA of severe acute respiratory syndrome coronavirus. Proc Natl Acad Sci U S A 100, 12995-3000 (2003).
10. Becker, M.M. et al. Synthetic recombinant bat SARS-like coronavirus is infectious in cultured cells and in mice. Proc Natl Acad Sci U S A 105, 19944-9 (2008).
11. Follis, K.E., York, J. & Nunberg, J.H. Furin cleavage of the SARS coronavirus spike glycoprotein enhances cell-cell fusion but does not affect virion entry. Virology 350, 358-69 (2006).
12. Scobey, T. et al. Reverse genetics with a full-length infectious cDNA of the Middle East respiratory syndrome coronavirus. Proc Natl Acad Sci U S A 110, 16157-62 (2013).
13. Almazan, F., Marquez-Jurado, S., Nogales, A. & Enjuanes, L. Engineering infectious cDNAs of coronavirus as bacterial artificial chromosomes. Methods Mol Biol 1282, 135-52 (2015).
14. Yang, Y. et al. Two Mutations Were Critical for Bat-to-Human Transmission of Middle East

Respiratory Syndrome Coronavirus. J Virol 89, 9119-23 (2015).
15. Watanabe, R. et al. Entry from the cell surface of severe acute respiratory syndrome coronavirus with cleaved S protein as revealed by pseudotype virus bearing cleaved S protein. J Virol 82, 11985-91 (2008).
16. Menachery, V.D. et al. SARS-like WIV1-CoV poised for human emergence. Proc Natl Acad Sci U S A 113,
3048-53 (2016).
17. È possibile creare un virus in laboratorio senza lasciare traccia? La risposta dell'esperto. Huffingtonpost.it,
https://www.huffingtonpost.it/entry/e-possibile-creare-un-virus-in-laboratorio-senza-lasciare-traccia-larisposta-dellesperto_it_5f5f3993c5b62874bc1f7339 (2020).
18. (South China Agricultural University: Pangolins Are The Possible Intermediate Host of SARS-CoV-2). IFENG NEWS,
https://news.ifeng.com/c/7tr8u2sAQFc (2020).
19. Lam, T.T. et al. Identifying SARS-CoV-2-related coronaviruses in Malayan pangolins. Nature, 10.1038/s41586-020-2169-0 (2020).
20. Tommy Tsan-Yuk Lam, M.H.-H.S., Hua-Chen Zhu, Yi-Gang Tong, Xue-Bing Ni, Yun-Shi Liao, Wei Wei,
William Yiu-Man Cheung, Wen-Juan Li, Lian-Feng Li, Gabriel M Leung, Edward C. Holmes, Yan-Ling Hu, Yi Guan. Identification of 2019-nCoV related coronaviruses in Malayan pangolins in southern China. bioRxiv, doi.org/10.1101/2020.02.13.945485 (2020).
21. Xiao, K. et al. Isolation of SARS-CoV-2-related coronavirus from Malayan pangolins. Nature, 10.1038/s41586-020-2313-x (2020).
22. Shang, J. et al. Structural basis of receptor recognition by SARS-CoV-2. Nature 581, 221-224 (2020).
23. Ge, X.Y. et al. Coexistence of multiple coronaviruses in several bat colonies in an abandoned mineshaft.
Virol Sin 31, 31-40 (2016).
24. Li, F. Structure, Function, and Evolution of Coronavirus Spike Proteins. Annu Rev Virol 3, 237-261 (2016).
25. Hu, B. et al. Discovery of a rich gene pool of bat SARS-related coronaviruses provides new insights into
the origin of SARS coronavirus. PLoS Pathog 13, e1006698 (2017).
26. Ge, X.Y. et al. Isolation and characterization of a bat SARS-like coronavirus that uses the ACE2 receptor.
Nature 503, 535-8 (2013).
27. Mou, H. et al. Mutations from bat ACE2 orthologs markedly enhance ACE2-Fc neutralization of SARS-
CoV-2. bioRxiv, https://doi.org/10.1101/2020.06.29.178459 (2020). 67
28. Piplani, S., Singh, P.K., Winkler, D.A. & Petrovsky, N. In silico comparison of spike protein-ACE2 binding affinities across species; significance for the possible origin of the SARS-CoV-2 virus. arXiv, arXiv:2005.06199 (2020).
29. Liu, Y. et al. Functional and genetic analysis of viral receptor ACE2 orthologs reveals a broad potential host range of SARS-CoV-2. Proc Natl Acad Sci U S A 118(2021).
30. Wrobel, A.G. et al. Structure and binding properties of Pangolin-CoV spike glycoprotein

inform the evolution of SARS-CoV-2. Nat Commun 12, 837 (2021).
31. Hou, Y.J. et al. SARS-CoV-2 Reverse Genetics Reveals a Variable Infection Gradient in the Respiratory Tract. Cell 182, 429-446 e14 (2020).
32. Segreto, R. & Deigin, Y. Is considering a genetic-manipulation origin for SARS-CoV-2 a conspiracy theory that must be censored? Preprint (Researchgate) DOI: 10.13140/RG.2.2.31358.13129/1 (2020).
33. Ge, X.Y. et al. Detection of alpha- and betacoronaviruses in rodents from Yunnan, China. Virol J 14, 98 (2017).
34. Day, C.W. et al. A new mouse-adapted strain of SARS-CoV as a lethal model for evaluating antiviral agents in vitro and in vivo. Virology 395, 210-22 (2009).
35. Yan, L.M. et al. Combined use of live-attenuated and inactivated influenza vaccines to enhance heterosubtypic protection. Virology 525, 73-82 (2018).
36. Gu, H. et al. Adaptation of SARS-CoV-2 in BALB/c mice for testing vaccine efficacy. Science 369, 1603- 1607 (2020).
37. Dinnon, K.H., 3rd et al. A mouse-adapted model of SARS-CoV-2 to test COVID-19 countermeasures. Nature 586, 560-566 (2020).
38. Walls, A.C. et al. Structure, Function, and Antigenicity of the SARS-CoV-2 Spike Glycoprotein. Cell 181, 281-292 e6 (2020).
39. Almazan, F. et al. Construction of a severe acute respiratory syndrome coronavirus infectious cDNA clone and a replicon to study coronavirus RNA synthesis. J Virol 80, 10900-6 (2006).
40. Yount, B., Denison, M.R., Weiss, S.R. & Baric, R.S. Systematic assembly of a full-length infectious cDNA of mouse hepatitis virus strain A59. J Virol 76, 11065-78 (2002).
41. Zeng, L.P. et al. Bat Severe Acute Respiratory Syndrome-Like Coronavirus WIV1 Encodes an Extra Accessory Protein, ORFX, Involved in Modulation of the Host Immune Response. J Virol 90, 6573-6582 (2016).
42. Thao, T.T.N. et al. Rapid reconstruction of SARS-CoV-2 using a synthetic genomics platform. Nature (2020).
43. Vashee, S. et al. Cloning, Assembly, and Modification of the Primary Human Cytomegalovirus Isolate Toledo by Yeast-Based Transformation-Associated Recombination. mSphere 2(2017).
44. Yang, X.H. et al. Mice transgenic for human angiotensin-converting enzyme 2 provide a model for SARS coronavirus infection. Comp Med 57, 450-9 (2007).
45. Gretebeck, L.M. & Subbarao, K. Animal models for SARS and MERS coronaviruses. Curr Opin Virol 13, 123-9 (2015).
46. McCray, P.B., Jr. et al. Lethal infection of K18-hACE2 mice infected with severe acute respiratory syndrome coronavirus. J Virol 81, 813-21 (2007).
47. Jiang, R.D. et al. Pathogenesis of SARS-CoV-2 in Transgenic Mice Expressing Human Angiotensin- Converting Enzyme 2. Cell 182, 50-58 e8 (2020).
48. Winkler, E.S. et al. SARS-CoV-2 infection of human ACE2-transgenic mice causes severe lung inflammation and impaired function. Nat Immunol 21, 1327-1335 (2020).
49. Sia, S.F. et al. Pathogenesis and transmission of SARS-CoV-2 in golden hamsters. Nature (2020).
50. Korber, B. et al. Tracking Changes in SARS-CoV-2 Spike: Evidence that D614G Increases Infectivity of
the COVID-19 Virus. Cell 182, 812-827 e19 (2020).

https://childrenshealthdefense.org/defender/censored-dark-horse-podcast-bret-weinstein-robert-malone-inventor-mrna-vaccine-technology/?utm_source=salsa&eType=EmailBlastContent&eId=04efec71-8531-42cd-8bae-818ea0502083

# Cyber Polygon

July 9th, 2021

The international capacity building initiative aimed at raising the global cyber resilience and the expansion of intersectoral cooperation against cyberthreats.

Cyber Polygon is an annual online event which connects various global organisations to train their competencies, exchange best practices and bring tangible results to the world community.

Concept 2021

The ever-expanding digitalisation tightens the interconnectivity between people, companies and countries. The secure development of ecosystems across the globe will determine the future of humanity for decades to come.

Experts about Cyber Polygon

Technology and cybersecurity are of crucial importance in this COVID era. One of the most striking and exciting transformations caused by the pandemic has been our transition to the digital 'everything', both in our professional and also in our personal lives. I am glad that Cyber Polygon has proved itself as one of those brilliant initiatives that address the need for developing and enhancing global cyber resilience in the fight against cybercrime and cyberattacks.

Klaus Schwab'
Founder and Executive Chairman, World Economic Forum

Defence Scenario: Cyber Polygon 2020 Technical Exercise Write-up

On 8 July 2020, Cyber Polygon — an international online cybersecurity training — took place for the second time. The technical exercise was attended by 120 teams from some of the largest Russian and international organisations across 29 countries. Among the participants were: banks, telecom providers, energy suppliers, medical institutions, universities as well as government and law enforcement agencies.

The participants acting as Blue Teams had to defend their segments of the training infrastructure. The organisers (BI.ZONE) acted as the Red Team and simulated the cyberattacks.

The exercise included two scenarios: Defence and Response.

This article goes into details of the Defence scenario, where the participants had to repel an attack conducted by the Red Team, and covers the following topics:

- basic game mechanics
- infrastructure and game service provided to the participants
- vulnerabilities embedded in the services
- exploitation scenarios and attack detection methods
- vulnerability remediation methods

## Legend

According to the legend, the organisation's virtual infrastructure included a service which processed confidential client information. This service became the subject of interest to an APT group. Cybercriminals were going to steal confidential user data and then resell it on the Darknet in order to receive a financial benefit and cause damage to company reputation.

The APT group studied the target system in advance and discovered several critical vulnerabilities. The gang launched the attack on the day of the exercise.

### The Blue Teams had to:

- contain the attack as fast as possible
- minimise the amount of information stolen
- maintain the service availability
- The participants could apply any available and familiar methods and tools to protect the infrastructure.

## Core Mechanics

The team members who had participated in Attack-Defence CTF may have noticed some similarities between this format of cybersecurity competition and the scenario being described. However, during the Cyber Polygon training, the participants were not expected to attack each other — all they had to do was protect their own services.

This rule was introduced to ensure that all the participants were on an equal playing field and could focus on improving their defensive skills. Besides, it enabled a more objective assessment of the teams' skills due to more accurate quantitative metrics.

### The following indicators were used as metrics:

Health Points (HP). A simple numerical value. Every time when the Red Team successfully exploited a vulnerability in the Blue Team's services and captured the flag, the Blue Team lost HP. The more vulnerabilities the Red Team was able to exploit, the more HP the team lost. HP was deducted once per round.

Service Level Agreement (SLA). In the context of this scenario, SLA indicated the integrity and accessibility of a service. It was measured as a percentage (0–100%). The defending team lost SLA points if the service was made unavailable or malfunctioned at the moment the checker contacted it. The checker could access any service several times per round, but each team's services were checked an equal number of times. The resulting SLA was calculated as the percentage of successful checks (when the service was available and fully functional) to the total number of checks.

Checker is the mechanics that allowed the organisers to check if the teams' services were fully functional. Since the game service simulated a real web application, the checker was also used to ensure compliance with the rules of the game: the participants could not simply turn off the service or disable some of its features, all they could do was defend their segments against Red Team attacks.

The final score for the scenarios was calculated as SLA * HP.

The participants were given 30 minutes for preparation, i.e. they were supposed to familiarise themselves with the service provided, roll out monitoring and defensive tools and start searching for vulnerabilities in the service code.

After the 30 minutes began the so-called 'active phase' of the scenario: the Red Team started their attack. The active phase consisted of 18 rounds, 5 minutes each.

Before the start of the scenario, each team received 180 HP for each of the 5 vulnerabilities embedded in the service (900 HP in total). The team lost 10 HP for each vulnerability exploited. Thus, if the team had 3 vulnerabilities exploited during a round, it lost a total of 30 HP in this round, and if 5 vulnerabilities were exploited — 50 HP respectively.

Apart from controlling the availability of the teams' services, the checker was used to deliver the so-called flag to the teams' services at the beginning of each round (using legitimate service functions). Flag is a 'Polygon {JWT}' format string, where JWT stands for JSON Web Token. In this scenario, the flag represented confidential data: the more flags the Red Team was able to steal, the more data was leaked. A stolen flag also meant the exploitation of a vulnerability: the team lost HP once the Red Team took advantage of a vulnerability and grabbed the flag.

## Infrastructure and Game Service

Each participating team was provided with a virtual server running the Linux operating system.

After connecting via VPN, the participants got access to their server through SSH. The teams were granted full (root) access to their system.

The participants' game service was available from the user's home directory/home/cyber-polygon/ch4ng3org.

The game service backend was written in Ruby, while the frontend used the React JS framework. The database was managed by the PostgreSQL DBMS.

The service was designed to be rolled out on Docker, which was evident from its directory: for instance, it contained such files as Dockerfile and docker-compose.yml.

The participants had full access to the service's source codes, configuration files and the database, and could use this information to search for and fix vulnerabilities in the service.

## Vulnerabilities

### Insecure Direct Object References

The vulnerability referred to as insecure direct object reference (IDOR) is caused by flaws in authorisation mechanisms. The vulnerability allows an attacker to gain access to otherwise inaccessible user data.

This vulnerability was present in the game service under the get method of the UsersController class.

When calling the address http://example.com/api/users/<USER_ID>, where USER_ID is a numeric user identifier, any user could get a JSON object containing a numeric identifier and a username corresponding to that numeric identifier.

This functionality as such does not pose any threat to user data. You should rather focus on the following code snippet:

Note that if the full parameter is transmitted in a request, the server response will return more data: in addition to the user ID and username, it will contain their email and phone number.

The flags were stored in and could be stolen from the user.phone field in the game service's directory (this activity could be detected, for example, by analysing the network traffic). Each round, the checker created several users and saved the flag as one of such users' phone number.

In order to take advantage of this weakness, the Red Team sent requests like http://example.com/api/users/<USER_ID>?full=1 to the service and searched for the flag in the phone field of the output JSON objects.

To protect against this vulnerability, it would be good practice to obscure sensitive data when displaying it to the user. Thus, the phone number +71112223344 can be shown as +7111*****44.

For example:

In this case, the Red Team would have got a line like Polyg********X} instead of the full flag value and the participating team could have avoided losing HP due to this vulnerability being exploited.

Command Injection

Command injection is the result of inadequate filtering of user data. This vulnerability enables an attacker to inject OS commands that are executed on the target system with the privileges of the vulnerable application.

In the game service, the vulnerability was present in the disk_stats method of the StatsController class.

When calling the address http://example.com/api/disk_stats, the service responds with the output system df utility in the JSON object disk field, which allows to evaluate the amount of free space in the file system.

The command being called was designed to transmit various parameters, but their value is not filtered out:

This means that a potential attacker can execute virtually any command in the system using special command-line syntax.

For example, by running a request http://example.com/api/disk_stats?flags=;cat /etc/passwd a threat actor will be able to read the contents of system file /etc/passwd.

This is how the Red Team exploited this weakness

By sending a request http://example.com/api/disk_stats?flags=>dev/null;catconfig/secrets.yml, the attackers obtained the contents of the backend/config/secrets.yml file, which stored the private key for signing JWT tokens.

Having obtained the private key, the Red Team could generate and sign a JWT token valid for any user. Given that the Red Team used the current private key of the service, this token would have been successfully validated and accepted by the application.

By sending a request http://example.com/api/me on behalf of the user for whom the token was generated, the Red Team obtained the user's phone number and checked it for a flag.

To protect against this vulnerability, a sufficient measure was to prohibit any parameters from being injected in the command call, as the overall system performance is not tied to this endpoint being used:

Security Misconfiguration

The vulnerability known as security misconfiguration is usually caused by a human factor. Standard application configurations are often not specifically geared towards security. Due to the lack of proactivity, attention or competence of responsible staff, these configurations sometimes remain unadapted to harsh realities which comes with significant security implications.

The game service had this vulnerability embedded in the db service description, in the docker-compose.yml file.
As you can see, the network port of the database is available from the external network:

Besides, the database server uses one and the same line as a database name, username and password, which also matches the service ch4ng3.org.

Having detected the database port as a result of network scanning, the Red Team was able to brute-force the login and password to the database. It then executed an SQL statement below, which returned all user phone numbers with flags inside:

To protect against this vulnerability, the ideal solution would have been to prohibit the database from being connected externally and to change the database user password (with the api service reconfigured accordingly):

The application loads the line with the service public key from the configuration file and, where an RS256 algorithm has been transmitted in the token, converts that line to an RSA public key, which is further used to verify the token signature.

Note that if any other value is transmitted in the algorithm parameter, the public key line will not be converted. If the HS256 value is sent to the alg JWT field, the HMAC symmetric algorithm will be used for token signature verification, and exactly this public key line will be used as a key to verify the token signature.

This is how this weakness was exploited by the Red Team:

By sending a request http://example.com/api/auth/third_party, the attackers received the service public key from the public_key field of the output JSON object.

Having obtained the public key, the Red Team could generate a valid JWT token for any user by sending the HS256 value to the alg JWT field and signing the token, with the service public key line used as a secret for the HMAC algorithm.

By sending a request http://example.com/api/me on behalf of the user for whom the token was generated, the Red Team obtained the user's phone number and checked it for a flag.

To protect against this vulnerability, the following recommendation could have helped: when working with JWT, you better use only one signature algorithm at a time — either symmetric or asymmetric. Thus, the easiest fix would be:

Now, if you send a value other than RS256 to the token's alg field, the token will be marked as invalid and the Red Team will not be able to access the application on behalf of other users by signing tokens with the service public key.

YAML Insecure Deserialisation

The last vulnerability embedded in the game service was associated with YAML insecure deserialisation. The import method of the PetitionsController class was responsible for importing petitions through their YAML-format description.

As you may have noticed, the contents of a YAML object are taken from the base64-coded petition parameter and then converted into Ruby objects using the YAML.load(yaml) structure.

This structure is insecure and allows, among other things, arbitrary Ruby code execution

on the target system within the vulnerable application, which is what the Red Team did.

The code received the phone numbers of all users registered with the service, combined them through (;) and applied the raise structure to cause an exception, sending the line with the users' phone numbers as an error message.

The error message was then returned by the server to the JSON object message field together with the response code 500. Once the Red Team received this response, all it had to do was locate the flag in the error message.

To protect against this vulnerability, it was sufficient to replace the call of the YAML.load(yaml) function with the call of the YAML.safe_load(yaml) function. However, during the availability check, the checker verified that the transmitted YAML object allowed for aliases to be applied. Hence, the resulting structure is represented as follows: YAML.safe_load(yaml, aliases: true).

## Conclusion

In our article, we explored the vulnerabilities implanted in Cyber Polygon's Defence scenario game service, analysed the applied exploitation scenarios and gave examples of remediation that would have allowed the participants to protect their services against the Red Team.

We would use the patch methods from the examples in a real-life situation. However, you should keep in mind that these are not the only possible effective methods.

The scenario assumed that the participants would be able to defend themselves without having to patch the code in their game services. For example, to protect against the third vulnerability — security misconfiguration, which is associated with an insecure Docker configuration, it was sufficient to block the database port on the firewall.

However, we believe that the best solution is to remediate the flaws in services and applications rather than resorting to 'palliative' measures, which sooner or later may not be sufficient to withstand an attack. This is why we examined in detail the source code corrections as a means to protect against vulnerabilities.

We hope that you have found the exercise useful and insightful, and look forward to seeing you at the next Cyber Polygon events.

# CHAPTER FOUR

## WHO & WHY

1. Who's behind the first Global Bioweapon Attack on humanity?
2. Why Do They Want A "Vaccine In Every Arm?"
3. What's the end goal?

Trends & issues in crime and criminal justice
ISSN 1836-2206 (Online) | ISBN 978 1 925304 81 7 (Online)
No. 613 December 2020

# Corporate crime in Australia: The extent of the problem

By David Bartlett, Janet Ransley,
Lucy Forrester and Kristine Middendorp

ABSTRACT

Government and public concern about corporate wrongdoing in Australia is arguably at an all-time high.

However, the extent and nature of corporate crime is largely unknown; it is concealed by regulatory agency reporting practices and the absence of a single data source which combines data across all regulators.

Crimes committed by or on behalf of corporations are an increasingly prominent concern for governments, the media and the public. In Australia, the 2018 Royal Commission into Misconduct in the Banking,

Superannuation and Financial Services Industry (the Banking Royal Commission), appointed only after intense media and public agitation, has exposed the extent of wrongdoing in the financial services sector.

Prior studies and inquiries have revealed other corporate crimes including cartels, money laundering, foreign bribery, abuse of consumer rights, tax avoidance, non-payment of worker entitlements, and environmental harms, among many other types of malfeasance (see generally Grudnoff et al. 2016).

Submissions to the Senate inquiry into civil, criminal and administrative penalties for white-collar crime depicted a growing 'epidemic of corporate crime in Australia' (Senate Standing Committee on Economics 2017: 3).

This study addresses the problem by examining corporate offending by 33 of the country's top companies, and their wholly owned subsidiaries, over a five-year period.

The results indicate that corporate offending is patterned and unevenly distributed across the business community. Drawing on the findings and on their experience of conducting the research, the authors make recommendations for improving policy and practice, including the establishment of a national database of corporate offending.

# Yuval Harari's Blistering Warning To Davos In Full

We are Hackable Animals

This article is part of
the World Economic Forum Annual Meeting

• Humanity faces three existential threats this century, warned historian Yuval Harari at Davos 2020.
• Technology risks dividing the world into wealthy elites and exploited "data colonies," he explained.
• "If you like the World Cup - you are already a globalist," he said, making the case for better cooperation to tackle the challenges.

As we enter the third decade of the twenty-first Century, humanity faces so many issues and questions, that it is really hard to know what to focus on. So I would like to use the next twenty minutes to help us focus of all the different issues we face. Three problems pose existential challenges to our species.

These three existential challenges are nuclear war, ecological collapse and technological disruption. We should focus on them.

Now nuclear war and ecological collapse are already familiar threats, so let me spend some time explaining the less familiar threat posed by technological disruption.

In Davos we hear so much about the enormous promises of technology – and these promises are certainly real. But technology might also disrupt human society and the very meaning of human life in numerous ways, ranging from the creation of a global useless class to the rise of data colonialism and of digital dictatorships.

First, we might face upheavals on the social and economic level

Automation will soon eliminate millions upon millions of jobs, and while new jobs will certainly be created, it is unclear whether people will be able to learn the necessary new skills fast enough. Suppose you are a fifty-years-old truck driver, and you just lost your job to a self-driving vehicle. Now there are new jobs in designing software or in teaching yoga to engineers – but how does a fifty-years-old truck driver reinvent himself or herself as a software engineer or as a yoga teacher? And people will have to do it not just once but again and again throughout their lives, because the automation revolution will not

be a single watershed event following which the job market will settle down, into a new equilibrium. Rather, it will be a cascade of ever bigger disruptions, because AI is nowhere near its full potential.

Old jobs will disappear, new jobs will emerge, but then the new jobs will rapidly change and vanish. Whereas in the past human had to struggle against exploitation, in the twenty-first century the really big struggle will be against irrelevance. And it is much worse to be irrelevant than exploited.

Those who fail in the struggle against irrelevance would constitute a new "useless class" – people who are useless not from the viewpoint of their friends and family, but useless from the viewpoint of the economic and political system. And this useless class will be separated by an ever-growing gap from the ever more powerful elite.

The AI revolution might create unprecedented inequality not just between classes but also between countries.

In the nineteenth Century, a few countries like Britain and Japan industrialized first, and they went on to conquer and exploit most of the world. If we aren't careful, the same thing will happen in the twenty-first century with AI.

We are already in the midst of an AI arms-race, with China and the USA leading the race, and most countries being left far far behind. Unless we take action to distribute the benefit and power of AI between all humans, AI will likely create immense wealth in a few high-tech hubs, while other countries will either go bankrupt or become exploited data-colonies.

Now we aren't talking here about a science fiction scenario of robots rebelling against humans. We are talking about far more primitive AI, which is nevertheless enough to disrupt the global balance.

Just think what will happen to developing economies once it is cheaper to produce textiles or cars in California than in Mexico? And what will happen to politics in your country in twenty years, when somebody in San Francisco or Beijing knows the entire medical and personal history of every politician, every judge and every journalist in your country, including all their sexual escapades, all their mental weaknesses and all their corrupt dealings? Will it still be an independent country or will it become a data-colony?

When you have enough data you don't need to send soldiers, in order to control a country.

Alongside inequality, the other major danger we face is the rise of digital dictatorships,

Yuval Harari

that will monitor everyone all the time.

This danger can be stated in the form of a simple equation, which I think might be the defining equation of life in the twenty-first century:

**B x C x D = AHH!**

Which means? Biological knowledge multiplied by computing power multiplied by data equals the ability to hack humans, ahh.

If you know enough biology and have enough computing power and data, you can hack my body and my brain and my life, and you can understand me better than I understand myself. You can know my personality type, my political views, my sexual preferences, my mental weaknesses, my deepest fears and hopes. You know more about me than I know about myself. And you can do that not just to me, but to everyone.

A system that understands us better than we understand ourselves can predict our feelings and decisions, can manipulate our feelings and decisions, and can ultimately make decisions for us.

Now in the past, many governments and tyrants wanted to do it, but nobody understood biology well enough and nobody had enough computing power and data to hack millions of people. Neither the Gestapo nor the KGB could do it. But soon at least some corporations and governments will be able to systematically hack all the people. We humans should get used to the idea that we are no longer mysterious souls – we are now hackable animals. That's what we are.

The power to hack humans can be used for good purposes – like providing much better healthcare. But if this power falls into the hands of a twenty-first-century Stalin, the result will be the worst totalitarian regime in human history. And we already have a number of applicants for the job of twenty-first-century century Stalin.

Just imagine North Korea in twenty years, when everybody has to wear a biometric bracelet which constantly monitors your blood pressure, your heart rate, your brain activity twenty-four hours a day. You listen to a speech on the radio by the great leader and they know what you actually feel. You can clap your hands and smile, but if you're angry, they know, you'll be in the gulag tomorrow.

And if we allow the emergence of such total surveillance regimes, don't think that the rich and powerful in places like Davos will be safe, just ask Jeff Bezos. In Stalin's USSR, the state monitored members of the communist elite more than anyone else. The same will be true

of future total surveillance regimes. The higher you are in the hierarchy – the more closely you'll be watched.

Do you want your CEO or your president to know what you really think about them? So it is in the interest of all humans, including the elites, to prevent the rise of such digital dictatorships. And in the meantime, if you get a suspicious WhatsApp message, from some Prince, don't open it.

Now if we indeed prevent the establishment of digital dictatorships, the ability to hack humans might still undermine the very meaning of human freedom. Because as humans will rely on AI to make more and more decisions for us, authority will shift from humans to algorithms and this is already happening.

Already today billions of people trust the Facebook algorithm to tell us what is new, the Google algorithm tells us what is true, Netflix tells us what to watch, and the Amazon and Alibaba algorithms tell us what to buy. In the not-so-distant future, similar algorithms might tell us where to work and who to marry, and also decide whether to hire us for a job, whether to give us a loan, and whether the central bank should raise the interest rate.

And if you ask why you were not given a loan, and why you the bank didn't raise the interest rate the answer will always be the same – because the computer says no. And since the limited human brain lacks sufficient biological knowledge, computing power and data – humans will simply not be able to understand the computer's decisions.

So even in supposedly free countries, humans are likely to lose control over our own lives and also lose the ability to understand public policy.

Already now how many humans understand the financial system? Maybe one percent to be very generous. In a couple of decades, the number of humans capable of understanding the financial system will be exactly zero.

Now we humans are used to thinking about life as a drama of decision-making. What will be the meaning of human life, when most decisions are taken by algorithms? We don't even have philosophical models to understand such an existence.

The usual bargain between philosophers and politicians is that philosophers have a lot of fanciful ideas, and politicians basically explain that they lack the means to implement these ideas. Now we are in an opposite situation. We are facing philosophical bankruptcy.

The twin revolutions of infotech and biotech are now giving politicians the means to create heaven or hell, but the philosophers are having trouble conceptualizing what the new

heaven and the new hell will look like. And that's a very dangerous situation.

If we fail to conceptualize the new heaven quickly enough, we might be easily misled by naïve utopias. And if we fail to conceptualize the new hell quickly enough, we might find ourselves entrapped there with no way out.

Finally, technology might disrupt not just our economy, politics and philosophy – but also our biology.

In the coming decades, AI and biotechnology will give us godlike abilities to reengineer life, and even to create completely new life-forms. After four billion years of organic life shaped by natural selection, we are about to enter a new era of inorganic life shaped by intelligent design.

Our intelligent design is going to be the new driving force of the evolution of life and in using our new divine powers of creation we might make mistakes on a cosmic scale. In particular, governments, corporations and armies are likely to use technology to enhance human skills that they need – like intelligence and discipline – while neglecting other humans skills – like compassion, artistic sensitivity and spirituality.

The result might be a race of humans who are very intelligent and very disciplined but lack compassion, lack artistic sensitivity and lack spiritual depth. Of course, this is not a prophecy. These are just possibilities. Technology is never deterministic.

In the twentieth century, people used the same industrial technology to build very different kinds of societies: fascist dictatorships, communist regimes, liberal democracies. The same thing will happen in the twenty-first Century.

AI and biotech will certainly transform the world, but we can use them to create very different kinds of societies. And if you're afraid of some of the possibilities I've mentioned, you can still do something about it. But to do something effective, we need global cooperation.

All the three existential challenges we face are global problems that demand global solutions.

Whenever a leader says something like "My Country First!" we should remind that leader that no nation can prevent nuclear war or stop ecological collapse by itself, and no nation can regulate AI and bioengineering by itself.

Almost every country will say: "Hey, we don't want to develop killer robots or to genetical-

ly engineer human babies. We are the good guys. But we can't trust our rivals not to do it. So we must do it first".

If we allow such an arms race to develop in fields like AI and bioengineering, it doesn't really matter who wins the arms race – the loser will be humanity.

Unfortunately, just when global cooperation is more needed than ever before, some of the most powerful leaders and countries in the world are now deliberately undermining global cooperation. Leaders like the US president tell us that there is an inherent contradiction between nationalism and globalism, and that we should choose nationalism and reject globalism.

But this is a dangerous mistake. There is no contradiction between nationalism and globalism. Because nationalism isn't about hating foreigners. Nationalism is about loving your compatriots. And in the twenty-first century, in order to protect the safety and the future of your compatriots, you must cooperate with foreigners.

So in the twenty-first century, good nationalists must be also globalists. Now globalism doesn't mean establishing a global government, abandoning all national traditions, or opening the border to unlimited immigration. Rather, globalism means a commitment to some global rules.

Rules that don't deny the uniqueness of each nation, but only regulate the relations between nations.

And a good model is the Football World Cup

The World Cup is a competition between nations, and people often show fierce loyalty to their national team. But at the same time the World Cup is also an amazing display of global harmony. France can't play football against Croatia unless the French and the Croatians agree on the same rules for the game. And that's globalism in action.

If you like the World Cup – you are already a globalist

Now hopefully, nations could agree on global rules not just for football, but also for how to prevent ecological collapse, how to regulate dangerous technologies, and how to reduce global inequality. How to make sure, for example, that AI benefits Mexican textile workers and not only American software engineers. Now of course this is going to be much more difficult than football – but not impossible. Because the impossible, well we have already accomplished the impossible.

We have already escaped the violent jungle in which we humans have lived throughout history. For thousands of years, humans lived under the law of the jungle in a condition of omnipresent war. The law of the jungle said that for every two nearby countries, there is a plausible scenario that they will go to war against each other next year. Under this law, peace meant only "the temporary absence of war".

When there was "peace" between – say – Athens and Sparta, or France and Germany, it meant that now they are not at war, but next year they might be. And for thousands of years, people had assumed that it was impossible to escape this law.

But in the last few decades, humanity has managed to do the impossible, to break the law, and to escape the jungle. We have built the rule-based liberal global order, that despite many imperfections, has nevertheless created the most prosperous and most peaceful era in human history.

The very meaning of the word "peace" has changed

"Peace" no longer means just the temporary absence of war. Peace now means the implausibility of war.

There are many countries which you simply cannot imagine going to war against each

other next year – like France and Germany. There are still wars in some parts of the world. I come from the Middle East, so believe me, I know this perfectly well. But it shouldn't blind us to the overall global picture.

We are now living in a world in which war kills fewer people than suicide, and gunpowder is far less dangerous to your life than sugar. Most countries – with some notable exceptions like Russia – don't even fantasize about conquering and annexing their neighbors. '

Which is why most countries can afford to spend maybe just about two percent of their GDP on defense, while spending far, far more on education and healthcare. This is not a jungle.

Unfortunately, we have gotten so used to this wonderful situation, that we take it for granted, and we are therefore becoming extremely careless. Instead of doing everything we can to strengthen the fragile global order, countries neglect it and even deliberately undermine it.

The global order is now like a house that everybody inhabits and nobody repairs. It can hold on for a few more years, but if we continue like this, it will collapse – and we will find ourselves back in the jungle of omnipresent war.

We have forgotten what it's like, but believe me as a historian – you don't want to be back there. It is far, far worse than you imagine.

Yes, our species has evolved in that jungle and lived and even prospered there for thousands of years, but if we return there now, with the powerful new technologies of the twenty-first century, our species will probably annihilate itself.

Of course, even if we disappear, it will not be the end of the world. Something will survive us. Perhaps the rats will eventually take over and rebuild civilization. Perhaps, then, the rats will learn from our mistakes.

But I very much hope we can rely on the leaders assembled here, and not on the rats.

Thank you.

~ Yuval Harari

# Dr. of Law Reiner Fuellmich Interviews Whitney Webb July 5th, 2021

https://www.bitchute.com/video/A16ypzsK5bZU/

Dr. of Law Reiner Fuellmich - Dr. Viviane Fischer - Dr. Wolfgang Wodarg - Dr. Rain Antonia Fi

### *Dr. Reiner Fuellmich: [Corona Committee]*

We were interviewing a medical doctor who managed to publish, together with other colleagues, a new study on the benefits and risks of masked mandates. They managed to publish it in one (1) of the most renowned medical magazines, Journal of Pediatrics. It is making headlines already. It was very difficult to get it published; but, he did it. He just filmed a short video clip of nine minutes or so (~ 9 min) on their new study; published it on their website; and, it was taken down by YouTube within minutes. What is going on there? Who is trying to influence what and by what means?

### *Whitney Webb: [Investigative Journalists]*

I would 1st of all point to the parent company of YouTube, Google, which, among other things, is invested directly in the AstraZeneca vaccine through Vaccitech. More broadly, I would point to the push by Silicon Valley to remake the health care system entirely. I would also point to the information about the push to move to telemedicine. [use of electronic information/ telecommunication technology for health care while practicing social distancing; protect self/ healthcare provider from Covid-19] Telemedicine aims to change the normal paradigm of medical care. Google is specifically invested in that along with [Trump made Kushner Director Department to turn Government Agencies over to private corporations; working with Silicon Valley/ huge operations in Tel Aviv]. Google along with Microsoft and others are looking to move to healthcare to basically replace doctors with artificial intelligence, smartphone applications and things like that. There are efforts underway in the United Kingdom, where I live, to replace the National Health Service (NHS) with something called NHSX. NHSX is basically an application along these lines. They are seeking to replace the existing medical system down the line. Of course, they had plans to do this before Covid-19. [join Department of Health & Social Care/ NHS England/ NHS Improvement; drive digital transformation of care; working with partners/ stakeholders to transform health/ social care through digital technology]. In the United States, the former Head of Google, Eric Schmidt was in charge of the National Security Commission on Artificial Intelligence. They had a presentation that they authored in 2019 that did not come out until a year or so later. It said:

*"The changes we need to see in the widespread implementation of emerging technologies, including AI, needed to happen in healthcare 1st."*

We have seen that happen over the course of the past year.

***Fuellmich:***

Are they using healthcare as a crowbar to get full control?

***Webb:***

That is where they have started. "Reimagine Healthcare" is a way of taking control over the lives of people; telling them it is for the benefit of the public; the collective for public health; and, their personal health; while being the way to implement the transhumanist or technocratic biotechnologies under the guise of it being a health-related venture. Google, of course, is intimately invested in all of this. They are partnered in a lot of this directly with the United States Military. The fact that they are censoring anything that goes against the narrative that they want to put forth on matters relating to public health, whether it is Covid-19; or, really anything else, should not surprise anyone.

***Fuellmich:***

Did you say Google is invested in AstraZeneca?

***Webb:***

Yes. The AstraZeneca Oxford vaccine they have been publicly framing for a long time as "non-profit" is not exactly true. The two (2) developers of that at the Jenner Institute at Oxford, Sarah Gilbert and Adrian Hill are Co-Founders of a company on which the technology of that vaccine is based, called Vaccitech. Google Ventures is one (1) of the main investors in that company, which is set to make a lot of profit as soon as Vaccitech decides that the pandemic, from their perspective, has ended. They can make that declaration as a company whenever they feel like it, really.

***Fuellmich:***

I saw a video interview of you with Bobby Kennedy. I know you are an investigative journalist.

What is your background?

***Webb:***

I started off as a staff writer for Mint Press News, which is a United States-based media outlet. I eventually became their Senior Investigative Reporter. I did a series on the Jeffrey Epstein scandal that got a lot of buzz. I left near the beginning of 2020 to do my own thing. I partnered with a website that is mainly a YouTube Channel, called The Last American Vagabond as a partnership.

***Fuellmich:***

I did not understand. How can they end the pandemic? What happens if they do?

***Webb:***

It is how they set this up. They just declare it as that. They can do that as a company. They do not necessarily have the public say as to whether that is the case or not; but, they can then start generating more profit than they have been off the AstraZeneca vaccine Canada. I should mention also that besides the Google investment, the United Kingdom Gov-

ernment is invested in Vaccitech; and, is expected to make a profit off that vaccine despite how it was presented to the public. The other main stakeholder is Bravos Capital which was set up by the former Head of Global Equity Trading at Deutsche Bank.

***Fuellmich:***

It fits right in.

***Viviane Fischer: [Corona Committee]***

CureVac holds the patent on the Pfizer-BioNTech vaccine in which the German Government has invested.

***Fuellmich:***

The German Goverment owns twenty percent (20%) of the shares of CureVac; and the German Government is the patent holder to the vaccine.

***Webb:***

That would be the Pfizer-BioNTech vaccine.

***Fuellmich:***

We have now three (3) shareholders that have invested in Vaccitech:

1. Bravos Capitol with Deutsche Bank
2. The United Kingdom Government
3. Google Ventures

Is that all of the stakeholders in Vaccitech?

***Webb:***

Technically, the Bravos Capital investment is through Oxford Science Innovations. Bravos Capital is the main shareholder of Oxford Science Innovations. In that way, they hide it.

***Fuellmich:***

Are there other stakeholders in Vaccitech?

***Webb:***

Yes, there is:

4. Fosun Pharma, the Chinese Branch of Sequoia Capital
5. Wellcome Trust

***Fuellmich:***

Everyone

***Webb:***

Wellcome Trust is intimately involved with the AstraZeneca vaccine. They are the institution most involved with them to a significant degree. They have some pretty disturbing eugenicist claims that we can get into if those are of interest. The Wellcome Trust investment is through Oxford Science Innovations.

***Fuellmich:***

This is something I have never heard before. Viviane has obviously heard of this. Is Vaccitech, which we are discussing right now, one (1) of the major vehicles of this vaccine scheme?

***Webb:***
The involvement of Vaccitech is specifically for the technology used from the AstraZeneca Oxford vaccine. Of course, they plan to use more vaccines with that. The vaccines produced by the Jenner Institute are intimately linked to Vaccitech because the people that run the Jenner Institute are also the people that founded Vaccitech. The Jenner Institute and the vaccine that is tied to Vaccitech are conducting trials on really young children in Africa right now for a universal malaria vaccine. They say the trial started in December 2020. The Jenner Institute led by Adrian Hill, who developed the AstraZeneca Oxford vaccine, has quite a nasty background. They were not honest with parents about the risks of the vaccine trials. It was in South Africa where seven (7) infants died. They lied about the risks. They knew the vaccine was ineffective before they did the trial; but, they did it anyway. Their conclusion of that trial was that it was ineffective, even though they knew that well in advance.

***Fuellmich:***
They knew that well in advance; but, they still went forward with this?

***Webb:***
Yes. This was in 2009. They have a track record of being very dishonest with their trials. They also hid results of animal trials from parents.

***Fischer:***
What is the Jenner Institute? What is their general purpose? How long have they been around?

***Webb:***
Originally the Jenner Institute was a public-private partnership with GlaxoSmithKline in the United Kingdom Government in the 1990s. GlaxoSmithKline pulled out, were remade and reopened in 2005. They are one (1) of the main vehicles at Oxford University for vaccine development. More broadly, GlaxoSmithKline is the main vehicle for United Kingdom vaccine funding research in general because the Head of Jenner Institute, Adrian Hill, is also the chief person at the United Kingdom Vaccine Network which decides which vaccine technology to research, what vaccines to fund and with what vaccines to inject the population in the United Kingdom and globally through "vaccine philanthropy". [Note: March 6, 2016 CN reports: "As Director of the Jenner Institute, Adrian Hill is creating a well-crafted 'potion' of ingredients which, when combined inside a vaccine, could prepare our immune system to attack biological invaders. The Hill formulation could one day (1d) form the foundation to protect humans from a range of diseases including malaria, HIV and tuberculosis."]

***Fischer:***
Is the Jenner Institute independent; a public-private partnership. What is their purpose?

***Webb:***
The Jenner Institute is part of the Oxford University. It used to be a public-private partnership; but, GlaxoSmithKline removed itself. GlaxoSmithKline is also intimately tied to

the Wellcome Trust, which again is very much connected to the Jenner Institute. The Wellcome Trust is named for Henry Wellcome. The company Burroughs Wellcome was part of GlaxoSmithKline before the 1990s when they merged with Glaxo. Burroughs Wellcome is where the Wellcome Trust essentially comes from.

***Fuellmich:***

To summarize: This seems to be the crowd that pushes the AstraZeneca vaccine; but, then there is another crowd, probably around the Bill & Melinda Gates Foundation. Is the Wellcome Trust around the Gates Foundation that is pushing the mRNA vaccines?

***Webb:***

Yes, but it is slightly different. If you have noticed how this has played out over time, the AstraZeneca vaccine has largely been banned in most developed countries. Or, in most developed countries they have restricted its use, keeping it mainly for the elderly, which is the case in the United Kingdom. There are some countries that have banned it outright. However, Contemporary Culture Virtual Archive in XML (COVAX), which I am sure you are familiar with . . . [pillar of Access to Covid-19 Tools (ACT) Accelerator; global collaboration to accelerate development/ production/ access to tests/ treatments/ vaccines; co-led by Gavi/ Coalition for Epidemic Preparedness Innovations (CEPI)/ World Health Organization (WHO); most/ diverse Covid-19 worldwide; supports research/ development/ manufacture of Covid-19 vaccine candidates; negotiates pricing]

. . . the Gates-backed effort to vaccinate the developing world relies almost entirely on AstraZeneca despite the fact that there have been all these findings that led countries in the developed world not to use it. Still, it is considered safe for Africa, Latin America, Southeast Asia and India. Clearly that is a considerable double standard. When you look into the history of the Wellcome Trust and the Gates Foundation, they are essentially experimenting on the developing world in things that pre-date Covid-19 considerably. It does not paint a very nice picture. The Pharmaceutical Industry does this; for example, with the polio vaccine. In most of the developed world it is now an inactivated polio vaccine. It was previously a live virus. The live virus polio vaccine was not discontinued despite the fact that evidence showed that it was causing more cases of polio than it prevented. The live vaccine is still widely used in the developing world, including where I used to live in Chile.

***Fischer:***

Are the Moderna and the Johnson & Johnson vaccines back-up vaccines? Or, how do they play into this larger picture?

***Webb:***

I know more about the AstraZeneca vaccine because I did a long report on it that got me de-platformed from Patreon. I do not exactly know how the Johnson & Johnson vaccine was developed and its background; but, Johnson & Johnson has a really bad track record, as well, which I think should be pretty obvious to anyone who looks into the large pharmaceutical companies. I think, by in large, the mRNA vaccines are used more in the developed world than the developing world. That is how it has played out to a significant

degree thus far. They could be back-up vaccines. We do not know the long-term effects of these vaccines. So, I think the more accurate answer to that question will probably come within the coming months or years. I do think it is significant that the Johnson & Johnson vaccine was physically being manufactured in the United States by a company called Emergent BioSolutions. [Global Specialty Life Sciences American multinational specialty bio-pharmaceutical company headquartered in Gaithersburg Maryland; develops vaccines/ antibody therapeutics for infectious diseases/ opioid overdoses/ medical devices for biodefense for civilian/ military populations for intentional/ naturally emerging public health threats]. Emergent BioSolutions was founded September 5, 1998 under the name BioPort; and, renamed Emergent BioSolutions in 2004. It was created as a spin-off of a fusion of Porton Down, which is the United Kingdom bio-defense/ bio-weapons laboratory, called the Defense Science & Technology Laboratory, and William J. Crowe, former Head of the Joint Chiefs of Staff of the United States Military under President Ronald Reagan. That is how Emergent BioSolutions came to be. As I revealed in a series I did last year, Emergent BioSolutions was intimately involved with what happened with the 2001 Anthrax attack. It was the only way they were going to save their mandatory for United States Military personnel Anthrax vaccine program. They have been involved in scandals ever since then to a significant degree; but, were chosen to manufacture a Covid vaccine despite that. The person they put in charge of their quality control facility that was manufacturing the Johnson & Johnson vaccine has no experience at all in any field of pharmaceutical development or chemistry. His background is as the Head of teams of Military Intelligence for the United States Military in Iraq and Afghanistan. He is also an expert on Iran and North Korea. Given his background, it really does not make sense why he would be in charge of quality control for the development of a Covid vaccine. More recently, the scandal that has developed in the United States with the Johnson & Johnson vaccine is that these batches were "ruined", they say; basically unusable. Who knows what would have happened to people had they had been widely used. It is very interesting that this is the company that manufactured that vaccine. Of course, they gave Johnson & Johnson a pass on that. The blame has been placed on Emergent BioSolutions. Of course, nothing has really been done to Emergent BioSolutions as a company either. They are intimately connected to the United States Military, the CIA and a military contractor in Ohio, Battelle, which has a lot of ties with the Anthrax attacks as well.

***Dr. Wolfgang Wodarg: [retired Medical Director Internist-Pulmonologist, Social Medicine, Hygiene & Environmental Medicine Physician, 1994-2009 German Bundestag Member, Parliamentary Assembly Honorary Member]***

We have a situation where all the vaccines have Emergency Use Authorization (EUA) and many controls are being bypassed. We suspect that the vaccine industry may be using this to find out what is possible with RNA manipulations via these vaccines. There were strict rules respecting the use of such technologies. It seems that now they can do anything they want. I think the patents in this field have grown rather rapidly because it appears that this technology is suddenly being applied in many fields. We see reports of magnets

sticking to vaccine sites without seeing anything that explains it. I think we need means to control what is in these vaccines. The companies have not declared the contents of the vaccines. We found out that some jabs were only made of saline solution. Those may be the controls they are using for studies they are doing. Who is controlling the contents of the vaccines? Is there control independent of the producer and the FDA? Is there possibly a transparent way to control what is in the vaccines? Is anyone scanning the patents that have been requested or issued? Are they using this chance to do clinical studies undercover such that no one can control them? Are they making mankind the laboratory rats?

***Webb:***

It sounds like there are two (2) questions here. The 1st thing I want to say is that there definitely needs to be more attention given to the manufacturers of the vaccines. The developers ostensibly only develop the formulas which they give to the manufactures who then produce and create the vaccine that is injected into people. In the case of the United States, the main manufacturer, not just for the Johnson & Johnson vaccine; but, I believe for a few others as well, is Emergent BioSolutions. They have an awful track record. The Pentagon lost a lawsuit in 2004 in which they were accused of using United States personnel as laboratory rats in experimental off-label use of that particular Anthrax vaccine they were producing. So here we have a manufacturer with a nasty track record that is still being given contracts.

***Fuellmich:***

What was that lawsuit?

***Webb:***

It was the Pentagon. The United States Military and the Pentagon are intimately connected to BioPort, now Emergent BioSolutions. They have a lot of ties with the United States Military and the Department of Health & Human Services. In terms of the mRNA technology, I definitely agree that they seized on this opportunity to use it more widely. I would argue that the hidden hand in the mRNA technology is again the United States Military. If you look at both the Pfizer and the Moderna mRNA technology, they both started with a significant investment in 2013 to both companies from the Defense Advanced Research Projects Agency (DARPA) which is the advanced research branch of the United States Military. They are, of course, involved in a lot of other Orwellian transhumanist technologies for use on soldiers; and, also the general public. They are heavily invested in human brain machine interfaces among other things. A lot of the people there are very extreme. They recently teamed up in a significant way with the Wellcome Trust to create something called Wellcome Leap that I wrote about recently that is really quite unsettling. If you look back to 2016, you will see they were talking in health-focused mainstream media outlets in the United States about how Moderna had some major problems with their vaccine technology platform; but, they were highly secretive in that even people interviewed for jobs with them had to sign non-disclosure agreements before they were interviewed. Apparently in 2016 if they had too few nano-lipid particles to deliver the mRNA, the vaccine would not work; and, if they had too many it was toxic to the people who received it.

There is no indication in the mainstream medical literature that this problem was ever solved when it was rolled out. [in a publication as late as November 2020] In that article from 2016, and in a subsequent article in 2018 from the same outlet, C Net News, which is as main stream as it gets in the United States, they said they would need some kind of saving grace to rescue the company because at the time it was the most highly valued private biotech company in the United States; but, had no product on the market; just a lot of products in their pipeline. They needed some way to get their products to the public. So, I think that is pretty significant.

***Fuellmich:***

What was this significant investment by DARPA? Was it in 2013 or 2017?

***Webb:***

It was in 2013. It was the same with Pfizer. DARPA also invested in the mRNA technology of Pfizer which are the mRNA vaccines being used now. They were developed with DARPA money; and, of course, considerable influence from DARPA. The person who actually green-lighted those investments was Regina Dugan. She left DARPA in 2012. The investments were not formally made until 2013. Dugan left DARPA to create a DARPA equivalent for Google and then later for Facebook as well. She is the one (1) who teamed up with the Wellcome Trust to create Wellcome Leap, the DARPA equivalent for the Wellcome Trust; the Global DARPA, they say; the Global Health DARPA. It is very insidious.

***Fuellmich:***

What I did not understand: Was it after the Anthrax attacks that they developed a vaccine for Anthrax?

***Webb:***

No, they had it before. It did not work. It was killing people. Many in the United States Military were refusing to take it. It was getting to the point where they were physically tying down Military personnel and forcibly injecting them in the United States Military. It was a huge scandal.

***Fuellmich:***

How did this come out?

***Webb:***

Meryl Nass, the Medical Doctor [Internal Medicine Bar Harbor Maine; US Congressional Health Subcommittee; 8 yrs treating Gulf War Syndrome/ post mandatory Anthrax vaccination; illnesses indistinguishable] involved in the lawsuit is the person to talk to.

***Fuellmich:***

I know her.

***Webb:***

Nass was involved in the lawsuit brought by military veterans against the Pentagon. In 1998 the Anthrax vaccine was a mandatory policy for all military personnel, right when BioSolutions was created and the Anthrax vaccine was their only product and their only way to make money, even though it did not work. In September 2001 the Pentagon was

going to release a report about how to continue the Anthrax vaccine policy without this company and their toxic Anthrax vaccine. Of course, then 911 happened, the report did not come out, the Anthrax attacks happened and all of a sudden the concern over the issue of the Anthrax vaccine was replaced with WhyCall. The Anthrax vaccine is not only used in the Military now; but, also for 1st Responders, Police and teachers.

***Fuellmich:***

When were people killed with the Anthrax vaccine, before or after 911?

***Webb:***

It was announced in early October 2001; but, right after 911, people intimately tied to the Bush Administration and the Neocons were talking constantly about how Al-Qaeda and Iraq were going to attack Americans with Anthrax. The New York Times, in that same period of time did twenty-seven (27) articles in a couple of weeks about Anthrax. One (1) of the main authors of those articles was Judith Miller who later received a fake Anthrax letter during the attacks. Miller, along with a lot of top officials in the United States had been involved in an assimilation of what would be the Anthrax attacks called Dark Winter that took place in June 2001. The same people that produced the Dark Winter assimilation and later personally briefed Dick Cheney about it are the same people who oversaw and moderated the one (1) last year before the Coronavirus situation.

***Fischer:***

Is it correct that this is not Johnson & Johnson; but, rather Emergent BioSolutions?

***Webb:***

Emergent BioSolutions manufactures the Johnson & Johnson vaccine now.

***Fuellmich:***

Wolfgang has asked again about the nano-lipid particles. He is afraid, this is just a hypothesis; but, he is afraid they are experimenting with the amount of nano-lipid particles. Do you know anything about this? Does this have something to do with what is now called "shedding"?

***Webb:***

It is possible. I do not know exactly what they are doing with the current vaccines in that sense; but, Moderna said specifically well before, at least two years (2 yrs) before Covid-19 that this was a problem they could not solve. Now that it is being widely used in a situation of Emergency Use Authorization, which is not the same as being fully licensed, obviously, they have a lot more leeway potentially to do so; and, it honestly would not surprise me because they were pretty desperate as a company to get around that issue. The only way to really get around it, if they could not fix it; and, if having too high a dosage of nano-lipid particles was resulting in toxicity, if you want to get around that quickly, you need to have some sort of crisis or some other type of situation where they can obfuscate the nature of that issue. It is very unfortunate that little has been done about that admitted issue they were having with these vaccines before they were widely used on the public.

***Fischer:***
We know about these vaccines; at least we have come to the conclusion that this is not really dealing with a medical problem as if we have a full-blown epidemic or something like that. What do you think is the agenda behind it? Is it financial?

***Fuellmich:***
The Military is heavily connected with all of the so-called vaccines. Is there a conclusion that we can draw from this?

***Webb:***
Yes, I would argue so. I mentioned in the beginning of our conversation today about the Silicon Valley push to remake health care. A key part of that is what they call Precision Medicine. They describe Precision Medicine as medications, vaccines and gene therapies targeted to the individual, i.e., targeted to the genome of an individual. Under the guise of the Covid-19 testing is a huge effort to amass genetic data of people across the world. A lot of this is being held by the same Silicon Valley companies. In the case of the Western United States, a lot of Covid-19 testing has been done by Verily Life Sciences. [Alphabet company developing infrastructure/ solutions/ harness health information; data-driven; research/ care/ innovation; community well-being]. Verily is a Google subsidiary trying to make their AI health care based on this genetic data. A lot of those same biotechnologies for Precision Medicine also come from the United States Military; and, involve predictive diagnosis where they say, based on an AI algorithm you are likely to have "this" disease, whether it is Covid, cancer or anything else before you show symptoms of it. You should just take their word for it. That is being co-developed right now by Google and a part of the United States Military called Defense Innovation Unit. There are lots of other examples of this going on. So, I would argue that the wide-ranging use of these mRNA vaccines; and, treating them as regular vaccines; instead of when, in years past they were described by even United States media as gene therapy; is a way to normalize the same type of Silicon Valley-based Precision Medicine that they want to be the "new normal" in health care around the world.

***Wodarg:***
In July 2009 the German Bundestag passed a law changing the pharmaceutical law. They changed the definition of "vaccine". They inserted in the law that giving nucleic acids did not need to be called "genetic therapy"; but, rather could be called "vaccine".

***Fuellmich:***
When was that?

***Wodarg:***
It was summer 2009 just before the German Federal election during the time of the swine flu. In so doing, they opened the door to call genetic modification of human beings vaccines if it is aimed to fight infections.

***Webb:***
This is part of a broader move to normalize this type of "medicine" to make it acceptable

to the broader population so that even using the vocabulary that has been associated with more traditional medical interventions; but, instead apply it to things that are not traditional at all.

***Wodarg:***

We are now observing the coming out of a very long-running strategy.

***Webb:***

Yes, absolutely. If you look back at Julian Huxley (1887-1975) the Founding Director-General of the United Nations Education, Scientific & Cultural Organization (UNESCO) and former President of the British Eugenics Society, which still exists today . . .

***Fuellmich:***

Julian Huxley was brother of Aldous Huxley (1894-1963).

***Webb:***

Yes. The British Eugenics Society still exists. It is called the Galton Institute. They did not rename it until 1989. [Name change April 27, 2014: promote public understanding of human heredity; facilitate informed debate on ethics of reproductive technology]. Adrian Hill of the AstraZeneca vaccine spoke at their one hundred year- (100-yr) anniversary, celebrating one hundred years (100 yrs) of eugenics. The Wellcome Trust holds their archives, which they think is of great use to medicine. Going back to Julian Huxley, in 1946 he said: "We should make the unthinkable thinkable again." Roughly ten years (10 yrs) later he coined the term "transhumanism" and said:

"Gene editing as a eugenics science needs to be applied along with efforts to merge humans with machines as a way to create a new human being [human being 2.0]." That is going back to 1957. It is definitely an old agenda.

***Fuellmich:***

That was in 1946, right?

***Webb:***

In 1946 he made the statement about eugenics "making the unthinkable thinkable again". Then in 1947 he laid out the road map of how to do that in a book entitled "New Bottles for New Wine". This is about this new eugenics push.

[free download: https://archive.org/details/NewBottlesForNewWine ]. More recently, someone at the Galton Institute, the new Eugenics Society, David Galton, one (1) of their Board Members, published a book entitled "Eugenics: The Future of Human Life in the 21st Century" that was positively reviewed in the United Kingdom press. These gene editing "medicines" are front and center.

***Fuellmich:***

Let me clarify this. 1946 is when Julian Huxley said. "We have to make the unthinkable thinkable again." Was that not in connection with the founding of UNESCO?

***Webb:***

Yes, it was.

***Fuellmich:***

Was he the Director of UNESCO?

***Webb:***

He was the Founding Director-General of UNESCO.

***Fischer:***

With the economic crisis this Covid situation has caused, I do not see that there will be a lot of people able to pay for this tailored Precision Medicine; so, there might be a motive beside a financial one. Is this push for Precision Medicine a mere money-making scheme?

***Fuellmich:***

Control!

***Webb:***

Yes, I think it is about control; and, about eugenics. I think they want people to employ this type of medicine so much that I fully expect the Biden Administration; the Obama Administration in the United States substantially funded a lot of this Precision Medicine initiatives; Biden is creating a Health DARPA (HARPA) that is going to be led by Eric S. Lander (Jew). [Obama Co-Chair Council of Advisors on Science & Technology; Head of Broad Institute; Biden top science adviser; part of NIH; "NIH budget">$51 billion; Intelligence Advanced Research Projects Activity (IARPA) invests in high-risk/ high-payoff research on difficult challenges in the Intelligence Community (IC)] Lander has ties to eugenicists who were funded by Jeffrey Epstein, along with other people to lead this thing. It is all Precision Medicine. I fully expect a push for socialized medicine, Medicare for All in the United States that will only have gene medicine available and be offered to people free [Social Impact Bonds].

***Fuellmich:***

Mainstream media reported that Epstein wanted to create new people with his own DNA. What role did Jeff Epstein play in all this?

***Webb:***

Yes, Epstein wanted to seed the human race with his DNA. He had a lot of ideas. What is important is that although he is gone, the scientists he funded are still very much around. A key person to look at is George Church. George Church is a Harvard Geneticist. He has been openly accused of promoting geneticist ideas even by mainstream. Church promoted unethical human experimentation; trying to resurrect Neanderthal by implanting them into a human woman; really bizarre stuff. He is pretty heavily promoted. Something interesting about Epstein is the Edge Foundation, which was operating as a front for Epstein. Epstein was the only donor to the Edge Foundation from 2001 to 2017. The vast majority of the Edge Foundation money came from Epstein exclusively. It was a way for Epstein to gain influence over people both in Silicon Valley who were attendees; and, a lot of geneticist-type scientists at Harvard, MIT and a lot of top universities.

***Fuellmich:***

Was Epstein the Head of this? Was someone else using him to funnel their money through him?

***Webb:***

Epstein was an operative. I think there were a couple of things there. Epstein worked for more than one (1) Intelligence Agency doing different things. I think his main handler was a group of Zionist billionaires in the United States called the Mega Group, basically Leslie Wexner and the Bronfman family, all of whom have ties to organized crime going back to the 1920s and 1930s. They have a considerable amount of influence over both United States and Israeli politics. Epstein was very involved in science and the technology angle of things that we are seeing now; but, he definitely was not alone in that. He definitely was not the orchestrator of that. He was just a cog in the machine. A person to look at is Isabel Maxwell, sister of Ghislaine Maxwell, a World Economic Forum technology pioneer with ties to Israeli Intelligence and intimately involved in aspects of that. Isabel Maxwell was an associate of Epstein. They claim to be investigating those ties; but, they are still covering them up considerably. Another person is Bill Gates whose ties to Epstein most likely go back to the 1990s. This is based on considerable evidence that mainstream media refuses to publish.

***Fuellmich:***

What does that evidence say? What kind of connection was there between Gates and Epstein?

***Webb:***

If you believe the mainstream media narrative, they said that Gates and Epstein did not meet until 2011. However a 2001 United Kingdom newspaper, the Evening Standard had an article written by a reputable reporter that was never retracted; and, written before Epstein was notorious for anything. The article says that the main business partners of Epstein were Leslie Wexner, Donald Trump and Bill Gates. Maria Farmer, an Epstein survivor who worked for Epstein between 1995 and 1996 says she heard Epstein and Isabel Maxwell discuss Bill Gates as if they were good friends. Farmer says she expected Gates to visit one (1) of the properties of Epstein at some point. Farmer did not see Gates; but, knew Epstein and Maxwell were discussing Gates; and, that Epstein and Gates knew each other. Beyond that, there is a documented relationship between Isabel Maxwell and her companies and Bill Gates specifically. That is recorded in a 2001 Guardian article. Isabel Maxwell is very open about having inherited the espionage portfolio on behalf of Israel from her father, Robert Maxwell, sometimes called "the Superspy of Israel". In the Guardian article, according to the way the Guardian described it, Isabel starts purring when she talks about Bill Gates; and, talks in a fake United States Southern Bell accent even though she normally speaks in a British accent. She has never done this in any other interview; only when she talks about Bill Gates. Maxwell says she personally persuaded Gates to invest money in her company CommTouch, to maintain his tax-free status. CommTouch was basically a front for Israeli Military Intelligence at the time. The only way Gates could have done that to remain tax-free would have been to use the Bill & Melinda Gates Foundation Trust, which is the Bill & Melinda Gates Foundation philanthropic investment vehicle to invest in CommTouch. Epstein had documented times when, throughout the 1990s,

the closest advisor of Bill Gates, Nathan Myhrvold, who was also Chief Technology Officer of Microsoft, traveled with Epstein. They traveled together to the Microsoft Russian Conference in 1998. Myhrvold flew on the Epstein plane several times. That is documented. Epstein was seen taking under-age women to the offices of Myhrvold for undocumented reasons. There were several other executives at the Microsoft Russian Conference as well. Of course, Melanie Walker, the top Science Advisor for Epstein in the 1990s became the top Science Advisor for the Bill & Melinda Gates Foundation by 2005. So if we are to believe that Gates did not know Epstein until 2011, we have to ask: "Why would Gates hire a woman as the Science Advisor for his Foundation whose only resume reference was Science Advisor for Jeffrey Epstein?" You would have to know who Epstein was to want to hire her at your Foundation. There is definitely a considerable cover-up there. I would argue that it is because it shows potentially that Microsoft as a company is compromised by those same Intelligence-linked networks in which Epstein operated, along with a lot of other ties in terms of the Gates Foundation science and investments which may have had the influence of Epstein and Maxwell well before 2011.

***Fuellmich:***

Many of the people you are mentioning are obviously start-raving mad. If the public knew of these things you are speaking; if this came out; it if was verified; their entire belief of the world would collapse. What is going on?

***Webb:***

I think that is why some people are reticent to engage in this type of information. This was an issue that happened before Covid with things that have happened around the world. An example I am familiar with as someone from the United States, is what happened September 11, 2001. There are people twenty years (20 yrs) later who cannot handle any deviation from the official narrative. One (1) of the reasons the public is not aware is because of the increasing consolidation of media outlets in the hands of the elite who dominate the flow of information to their benefit to the greatest extent possible. Yes, a lot of people in these elite circles are totally crazy. That is because they have completely isolated themselves from any interaction with regular people or the general public. They live in bubbles where they have obsessions of achieving immortality through transhumanism and these technologies they are developing. They have a world view that is totally bizarre to most people in the general public if they were made aware. That is why you do not have a lot of people in the general public that tune in regularly to the Davos Meetings at the World Economic Forum. They discuss a lot of these things there that are really over the head of most people. One of their keynote speeches in 2020 was by Israeli Yuval Harari. He said that soon there will be an age of "digital dictators"; that humans have now been reduced to "hackable animals". Those are his terms. He says this is happening through the combination of genetic engineering and advances in brain-machine interface technology. Harari said: "Soon governments around the world will start introducing the idea of external wearable sensors that are now being promoted for health care." And, that soon these w advance to where they can read your emotions. The wearable of Amazon already claims

to be able to detect your emotional state based on bio-metrics like your voice. Facebook is developing one (1) that it claims to be able to read your nerve signals before you even move. That was developed by Regina Dugan who now works Wellcome Leap; and, previously worked for Facebook. Harari said: :Once these things are widely used the age of digital dictatorships will be irreversible." Harari is telling this to the crowd at the World Economic Forum, the most elite people in the world in January 2020; and, imploring them to control the use of this technology and to use it 1st before the "rats" gain access to this. Of course, you can speculate as to who the rats are supposed to be from the perspective of these individuals. It is quite a jarring speech.

***Fuellmich:***

What is his name?

***Webb:***

His name is Yuval Noah Harari. This is how the elite now view us, i.e., hackable animals. This occurred right before Covid hit in March 2020. This was in January 2020. "Time for you the elite to control the new hackable animals; and, lead them where you will." It is really quite jarring. I think this is really over the head of the most people. I think showing that video, even without commentary, although commentary does help, is very illustrative of the view of the elite.

***Fuellmich:***

Where do we find this?

***Webb:***

[video is linked below the title of this interview] I will happily send it to you. I have everything I talked about today; the Emergent BioSolutions stuff; the Anthrax stuff; the AstraZeneca vaccine; the Wellcome Leap and the Gates-Epstein connection; I have extensive documentation on all of that; so, I am happy to send that along.

***Fuellmich:***

Everything would be just cool with these people if they were in insane asylums; they are not.

***Fischer:***

It seems all the politicians and all the people in charge are playing along. Do you think they are all involved in the transhumanist agenda; or, believe in that? Or, do you think some sort of bribery could be going on with this whole Epstein kind of thing?

***Webb:***

I think there is a lot of division within the ruling elites; but, I think a lot of that division has to do with fighting over the spoils. I think it is more about power and control based on what I have seen in terms of how prevalent the transhumanist thing is. It definitely is prevalent; but, I am not exactly confident enough to say that everyone in the elite believes it. But, it definitely is very prevalent. Look at Klaus Schwab talking about what the 4th Industrial Revolution mean; and, how Covid-19 is the catalyst for the Great Reset to move into the

4th Industrial Revolution. Schwab describes that as the merging of biological, digital and virtual identities. This is essentially the positing of the merging of man and machines. This is someone who leads the World Economic Forum saying that. It obviously is prevalent enough for the people who attend the World Economic Forum meetings to be involved in that to be like: "Yes, that sounds cool to us. Let us go on with this push to create that kind of world." It obviously has to be prevalent for that many people to sign onto that.

***Fuellmich:***

Wolfgang is trying to tone this down a little bit. He said that back in 2005 when they came up with stem cell research they had ideas of creating new spare parts for the human body. That probably also had something to do with transhumanism.

***Webb:***

Wellcome Leap is doing that right now.

***Fuellmich:***

Wolfgang says that much of this cannot be realized because the human body does not accept this. It is an investment idea. That is what he believes is in the foreground here. They are trying to lure people into these investment schemes even if they do not work. I do believe however that you are right, that many of these people really believe in these theories. Klaus Schwab is evidently stark-raving mad

***Webb:***

I think it is hubris

***Fuellmich:***

Yes, it is a feeling of omnipotent. "We can do anything." But, they cannot. The "rats" are going to show them how it is when you get blown out of the water.

***Webb:***

Exactly! I think the indicator of that; although it is not really to the stem cell research angle; it is more the artificial intelligence angle; is that in my opinion, the elite definitely thought that by now they would have artificial intelligence much more advanced than it is. They are very desperate to trigger what they refer to as "singularity". It is very possible that they will never be able to do that. Singularity is making a conscious machine; and, these are the most unconscious people in the world trying to replicate consciousness. It is a lot of arrogance, I think. They are very invested in the power of technology. They know the only way they can micromanage the lives of so many people around the world; having so few people exert that much control over that many people through this technology; but, unfortunately for them, it really is not working. I think they want to cast these technologies and investments as technology that is inevitable. We have no power. We should just sit back. There is nothing we can do to stop these agendas. In reality, I do not think that is true at all. Unfortunately there are people in the independent media that play into this. They fall prey to that fear mongering. I think it needs to be resisted. They put these things on the splash pages of their research organizations. It is a propaganda tool to make us think that all of this stuff is inevitable.

***Fuellmich:***
To make us think that we do not have a chance.
***Webb:***
Right; and, I think that . . .
***Fuellmich:***
We do have a chance.
***Webb:***
Exactly!
***Fuellmich:***
We are the "rats", you know. We can blow things out of the water.
***Webb:***
I think, also, it is important to find out that consent matters to a huge degree, whether it is the vaccine or any of these other technologies that they are trying to push through. They want people to forget that consent matters. They want people to be afraid because throughout history fear has been their greatest tool. Once people shed the fear, it is much harder for them to push through any of these agendas.
***Fuellmich:***
That is the point.
***Fischer:***
I have two (2) questions to finish with. The Cyber Polygon thing: [unique cybersecurity even; combines technical training exercise/ corporate teams/online conference/ senior officials/ international organizations/ leading corporations to avoid cyberattacks]. How does it play into the film porn that we are exposed to? Apart from shining light on their agenda, what is your advice?
***Webb:***
I will answer the last question 1st because the 1st question is definitely a bit longer. In addition to exercising your right to consent; and, making a conscious decision to not emotionally engage with that fear, I really think the way out is counter economics. That people who oppose these agendas come together to produce what they need to survive independent of these systems. They think they will be ultimately successful because people are dependent on the governments and the corporations that are intimately involved in the corruption. The most powerful protest at this point is going to be an economic protest. Governments around the world are just waiting for more violence, protest or riots. They have lots of tools and plans to deal with those. For example, in the United States they are launching a war on domestic terror that is obviously going to target dissidents from the way it is written. They openly say that from a multinational approach it is very possible that much of the West could try to do something with that. The more visible we are trying to go to the streets is the type of response they are expecting. Whereas a passive, non-violent protest of economic resistance, counter-economics and becoming independent of the people trying to build these systems, I think is really the most effec-

tive way to counter it. I am not necessarily telling people not to protest; or, anything like that. But, people need to keep in mind the surveillance that they are setting up. They plan to take the more vocal people to court, give them legal trouble or other things. I think a broader counter-economics move in addition to a larger group of people not consenting and not engaging with the system is something they fear a lot more; and, I think could be really powerful. As far as Cyber Polygon goes: Before this Davos, the annual World Forum Meeting, Klaus Schwab gave a very predictive speech saying: "At some point this year . . . Perhaps we may see this in the next couple of months or not; but, indications of it are already there and have been for some time. But, Schwab said this: "The fear of Covid will give way to the fear of Climate Change." Of course, the so-called "cyber pandemic" was simulated in the Cyber Polygon exercise in July 2020. It is going to happen again on July 9, 2021. Basically Cyber Polygon, even though it is a simulation of this type of "cyberattack", is their way of faking a pandemic in the virtual world as a way to exert complete control over the virtual world, i.e., the Internet to foster censorship and link Internet access to digital bio-metric identification. This would be a way to eliminate alternative media on the Internet. But, also intimately involves the financial system as a way to prevent having anonymous financial transactions; which is ultimately going to come down to a war on cash and a war on cryptocurrency. We have already seen a lot of movement with their Net Space. But, if you look at the Cyber Polygon exercise, most of the partners are banks, including Deutsche Bank of which you are familiar, that have been teetering on the brink of collapse for a long time. The banks are desperate to introduce their own central bank digital currencies and reset the global financial system in such a way that they do not have to take any blame at all. What better way to do that than to have the whole banking system, as Cyber Polygon simulates taken down by Facebook hackers. They will attribute those hackers as being "this dissident group" or "this state actor" of really whomever they want. Of course, the banks are absolved from whatever financial carnage ensues. They have made it very explicit that this is what they plan to do through various different initiatives. The World Economic Forum and the Carnegie Endowment for International Peace have teamed up on this. An iShack group that represents the biggest Wall Street banks of America has done this as well. These initiatives are all partnered with Federal Reserve, the Central Banks of the United States, the European Central Bank and the Bank of England. They are all very much involved. The Russian Sberbank, [Savings Bank] whose main stakeholder is the Russian Government, is the main co-sponsor of the Cyber Polygon exercises. They have already introduced their central-bank-backed digital currency, the spercoin. They are attempting to make that a monopoly for all market services within Russia, having it based on their digital based "ecosystem". This is something to which these banks want to move. They need a manufactured crisis to get widespread adoption of that. I have a lot of documentation about Cyber Polygon and a couple of related articles that I am happy to send along.

***Fuellmich:***

Thank you very much. I am sure we are going to have lots more to talk about.

Sources & Reference Materials

1. Whitney Webb Archives
https://earthnewspaper.com/?s=Whitney+Webb
2. Dr. Reiner Fuellmich EarthNewspaper.com Archives
https://earthnewspaper.com/?s=Dr.+Reiner+Fuellmich
3. James Delingpole
https://rumble.com/user/JamesDelingpole
4. Webb - RFK Interviews WW - Bill Gates-Microsoft- Jeffry Epstein Relationship - Webb - Earth Newspaper - 21 05 28
https://www.bitchute.com/video/1N2BDQ1euA3Q [49:23]
5. Webb - Cover-Up Continues - Truth about Bill Gates-Microsoft- Jeffrey Epstein - Whitney Webb - Unlimited Hangout - 21 05 25
https://unlimitedhangout.com/2021/05/investigative-reports/the-cover-up-continues-the-truth-about-bill-gates-microsoft-and-jeffrey-epstein [49:23]
6. Webb - RFK Interviews WW - Bill Gates-Microsoft- Jeffry Epstein Relationship - Webb - Earth Newspaper - 21 05 28
https://childrenshealthdefense.org/defender/rfk-jr-the-defender-podcast-whitney-webb-coverup-bill-gates-jeffrey-epstein-relationship [49:23]
7. Class Action Lawsuit
https://www.corona-schadensersatzklage.de
8. Steve Bannon War Room Interviews Dr. Reiner Fuellmich
https://www.bitchute.com/video/Ml7lMZv30zHD [20:47]
9. Dr. Reiner Fuellmich Talks With James Delingpole
https://www.bitchute.com/video/rAogJZUgz44A [1:08:24]
10. Dangers of mRNA Injection - James Delingpole Interviews Dr. Mike Yeadon
https://www.bitchute.com/video/N4QM6ccE8RBY [1:05:57]
11. Global Bioterrorism - Dr. Reiner Fuellmich Interviews Dr. Peter McCullough
https://www.bitchute.com/video/cNa5JkmV27rj [48:13]
12. We Need A Nuremberg 2.0 by Dr. Reiner Fuellmich
https://earthnewspaper.com/index.php/2021/04/16/we-need-a-nuremberg-2-0-by-dr-reiner-fuellmich-1931/ [19:31]
13. Reiner Fuellmich Full Interview in Berlin: Planet Lockdown
https://www.bitchute.com/video/1tQWM3FJdGBm [24:56]
14. Covid-19 Greatest Crime against Humanity - Dr. Reiner Fuellmich
https://www.bitchute.com/video/VANHuvUm7N4e [49:00]
15. Crimes against Humanity - Fraudulent PCR Tests Taken to Court - Interview with Lawyer Reiner Füellmich
https://www.bitchute.com/video/Dg91lOV7cm0f [36:57]

## Whitney Webb - Unlimited Hangout

Whitney Webb has been a professional writer, researcher and journalist since 2016. She has written for several websites; and, from 2017 to 2020 Whitney was a staff writer and senior investigative reporter for Mint Press News. She currently writes for The Last American Vagabond. Her work is also found at Unlimited Hangout. Ms. Webb is without question the current worlds leading investigative journalist - unlimitedhangout.com/

# WHO & WHY

by Jeff Prager

The story is short. The Davos crowd of course!. At the top of the human food chain lie the owners of in-ground resources and the financial systems. The Rockefeller's, the Rothschild's, the Queen of England who owns most of the globes uranium mines and another almost 2000 billionaires from all walks of life and many countrues are at the top of the COVID Pyramid. Heck, they're at the to of EVERYTHING owning not just the stock but the shareholders stock too, of every corporation worth anything on this planet, hidden, obfuscated by legal mauevering that allow Vanguard and Black Rock to own it all. An hour or three researching the stock ownerships and shareholder's stock ownership at publc site on the internet makes this easily provable.

Coke and Pepsi each manufacture over 100 products from sodas to flavored waters and chips. But they are not competitors. Black Rock and Vangyard (and Often State Street) are the major stockholders of both corporations making them a complete and uncontrolled monopoly.

Vanguard and Black Rock are the major stock holders in Facebook, Yahoo, Google, Apple, Pfizer, Moderna, Johnson & Johnson, Coke, Pepsi, all food manufacturers, the oil producers, tje mines that produce the metals and everyone and everthing else.

Doing their bidding through blackmailing governments, elected officials, unelected administrators and corporate owners and using other means as simple as spreading their bilions of dollars around liberally, and profiting exponentially, are the Gates Foundation (GAVI), the George Soros Foundation and the Bill & Hillary Clinton Foundation using their non-profit status to launder the billions they're spending and distance those named above from any ownership or culpability (see: Corporate crime in Australia: The extent of the problem, Page 240).

Just below them are the Mainstream Media offering the same fear tactics 24/7, the Pharmaceutical companies, the Tech companies—Facebook, Amazon, Twitter, Google, Yahoo and all the rest—the World Bank, the International Monetary Fund (IMF), the World Health Organization (WHO), the World Economic Forum (WEF) and the yearly Davos Crowd—the real Psychopaths, who ultimately call the shots. Google on YouTube Trumps second Davos speech and you'll undestand why he's no longer the US president. A plan in the making for at least ten years—the evidence for that is clear—if not decades longer and the ecidence for that is well establaished (see: Dr. of Law Reiner Fuellmich Interviews Whitney Webb, July 5th, 2021, Page 254).

The virus is basically benign for those under 50 IF THEY ARE TREATED EARLY yet every

government agency across the planet has forbid any treatment of this corona virus. By refusing early treatment and sending ill patients home with instructions to go to the hospital if lips turn blue or difficulty breathing arises, the doctors themselves are responsible for the hospitals that were overloaded although very few were. The media showed us 2 or 3 hospitals, the same ones, repeatedly, claiming they were overloaded but the truth is, doctors all failed their oath to do no harm by telling people to go hiome and wait until theri lips turn blue and they themselves overloaded these few hospitals and failed their oaths by failing to treat or even see sick patients. Not a single large health care system connected doctor offered their patient early tratment. Now we know there's more than one safe, effective treatment and none require genetic injections. Several early treatment protocols reduce hospitalization and death by 85-90%.

No one needed to die yet the first 200,000 patients, more or less, were murdered by physicians who did NOT know how to treat advanced COVID and actually exacerbated the illness with the use of ventilators. Moreover, ventilators come with 7 pieces of integral equipment one of which is a feeding tube. The feeding tubes, nor any of the additional medical apparatus required to use with a ventilator were shipped. If you take a patient off a ventilator to feed them, they'll die. There are numerous, 100s of stories, of nurses watching patients on ventilators starve to death because the feeding tubes were not shipped with the ventilators shipped across the USA.

The WHY of COVID is simple. The coral reefs are dying, the Amazon is disappearing due to the clearing of land for factory farms and uncontrollable or purposely set fires, the oceans are polluted with not just plastic but EVERYTHING humans discard, the extractive industries, especially petroleum products has left the South American continent polluted beyond repair and the same is true, even more so, for the African continent where they have a major, unreported oil spill every single day.

For whatever the reasons, justified or not, the globalists have decided after decades of research that eliminating a substantial portion of the earths human population is the only way to save the planet long enough to terraform Mars and other planets. Eventually, in 50-100 years, this planet will be a wasteland unable to support human and animal life. The cockroaches will survive but little else will.

And look at us from their perspective. We're haters, the country is divided right down the middle and we can't agree on anything. But foremost in the book of earthly humans is the fact that we are murderers, killing one another in the streets of Chicago, Miami, New York, Minneapolis and every major city in the USA. We rape, we're serial killers, serial rapists and thieves on an international smuggling level with human trafficking and drugs of every kind sold for pennies in the streets of America.

And what about developing and underdeveloped countries where thousands of children die every year from Diarrhea or Malnutrition, easily combated with simple and incredibly cheap medical protocols. These are the useless eaters, the wandering souls, the artists, the workers of the land, those that roam from place to place, people, human beings like you and I that have been slated for destruction.

Lastly, these modified mRNA injections, while already causing an astounding number of adverse events, will cause cancers, neurological disorders, heart problems, any of almost 100 autoimmune disorders and eventually, death. These diseases won't appear for 2 or 3 years from now and no one will be able to directly connect their disorder with the modified mRNA injections which will soon be approved and added to the childhood and adult vaccination schedule.

Yes if we have hope, love for one another and resilience, we'll survive one way or another.

"The answer to Global Warming
is elimination
of a substantial portion
of the human population."

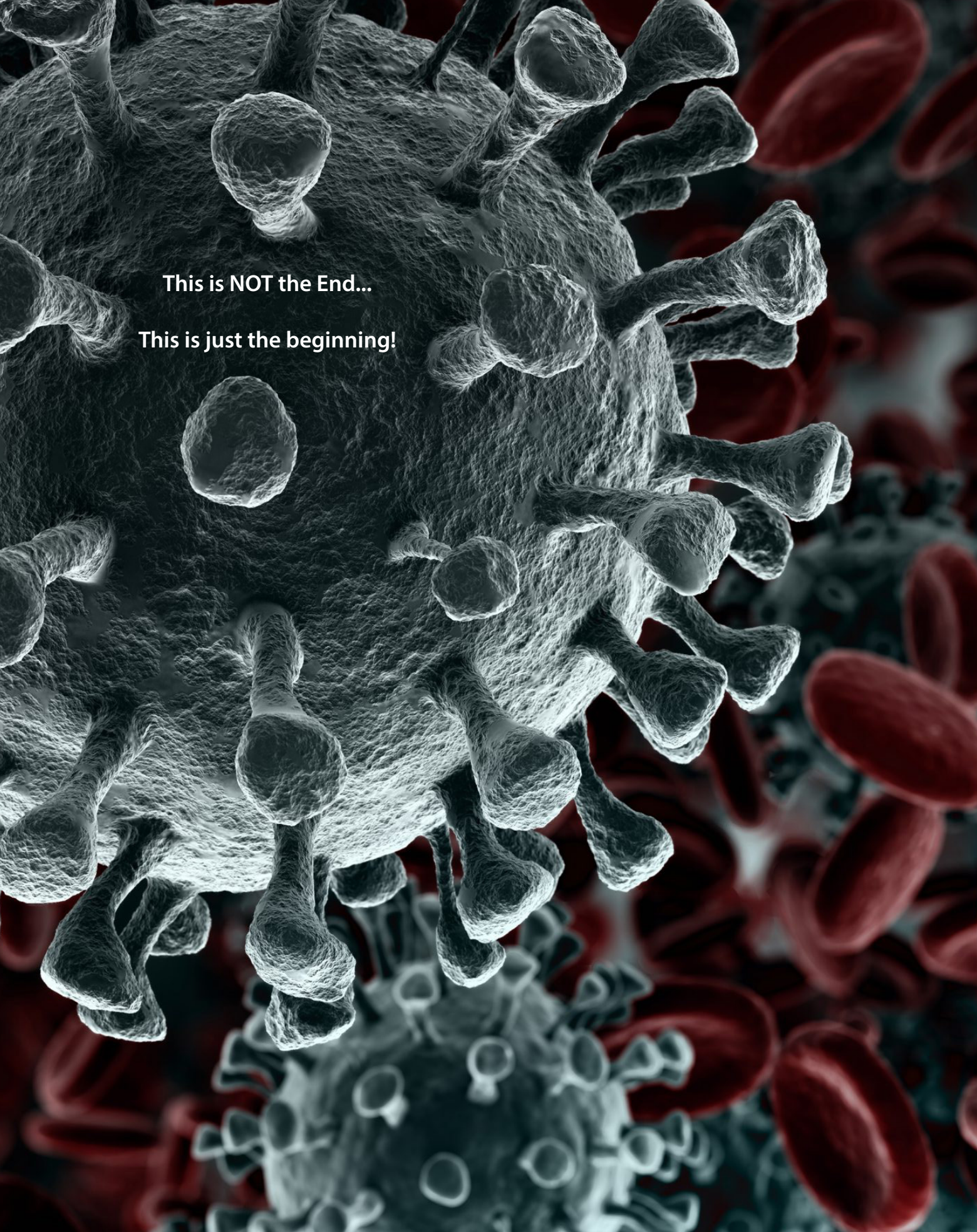
- Jeff Prager, July 16th, 2021

Ann, Camy, Syrena, Illiana and Kyle

This was and is for you, the love's of my life, my children and grandchildren. Do what's right, always. Don't obey, fight the machine, never give up, learn to know and understand one another with unconditional love, always, forever. I love all of you!

~ Dad and Grandpa

Jeff Prager • Author, Investigative Journalist, Publisher, CEO
Khalid Latif • Executive Editor & COO


This is NOT the End...
This is just the beginning!